

**Quarterly Operation, Maintenance,
and Monitoring Report for the
Bethpage Park Groundwater
Containment System**

September 2014

Operable Unit 3 (Former Grumman Settling Ponds)
Bethpage, New York

NYSDEC ID #1-30-003A



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1. Introduction

Pursuant to the Administrative Order on Consent (AOC) Index #W1-0018-04-01 (New York State Department of Environmental Conservation [NYSDEC] 2005) and the Operable Unit 3 (OU3) Record of Decision (NYSDEC 2013), ARCADIS of New York, Inc. (ARCADIS), on behalf of Northrop Grumman Systems Corporation (Northrop Grumman), has prepared this OU3 Bethpage Park Groundwater Containment System (BPGWCS) Quarterly Operation, Maintenance, and Monitoring Report (OM&M Report) for submittal to the NYSDEC. The present-day Bethpage Community Park property (Park) and the McKay Field and Plant 24 Access Roads, which the NYSDEC has termed the “Former Grumman Settling Ponds Area” and designated as OU3, are referred to herein as the Site Area. Figure 1 provides a Site Area location map.

The BPGWCS (previously referred to as the Groundwater Interim Remedial Measure) has been operational since July 21, 2009. This quarterly OM&M Report summarizes the operation, maintenance, and monitoring (OM&M) activities performed during the third quarter of 2014 (i.e., July 1 through September 30, 2014 [the “reporting period”]). During this reporting period, Remedial System and Environmental Effectiveness Monitoring Programs were conducted in accordance with the NYSDEC-approved OU3 groundwater Interim Operation, Maintenance, and Monitoring Manual (OM&M Manual; ARCADIS 2009) and the remedial well maintenance program described in the 2011 Annual Summary Report (ARCADIS 2012).

As discussed in the OU3 Site Area Remedial Investigation Report (Site Area RI) (ARCADIS 2011), Northrop Grumman does not take responsibility for certain compounds (e.g., Freon 12 and Freon 22) present in Site Area groundwater. Throughout this OM&M Report, a distinction is made between “Project” and “Non-Project” volatile organic compounds (VOCs), defined as follows:

- **“Project VOCs”:** VOCs that may be related to former Northrop Grumman historical activities. For this OM&M Report, Project VOCs include 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene (TCE); vinyl chloride (VC); cis-1,2-dichloroethene (cis-1,2-DCE); trans-1,2-dichloroethene; benzene; toluene; and total xylenes.
- **“Non-Project VOCs”:** VOCs, such as Freon 12 and Freon 22, that are understood to be unrelated to former Northrop Grumman activities but have been detected in Site Area groundwater. As noted in the Site Area RI (ARCADIS 2011), a sub-plume of Freon 22 has been identified originating from the area of the Town of

Oyster Bay's (Town's) former ice rink (shown on Figure 2). Based on Town information (Zervos 2007), Freon 22 was used by the Town and released to the environment.

2. Bethpage Park Groundwater Containment System Objectives

Remedial action objectives (RAOs) for the BPGWCS are as follows:

- Mitigate the off-site migration of project-related, dissolved-phase VOCs. Specifically, the BPGWCS addresses:
 - Groundwater that has total VOC concentrations greater than 5 micrograms per liter ($\mu\text{g/L}$) in the upper 20 feet of the surficial aquifer across the 1,200-foot-wide lateral extent of the Site Area southern boundary.
 - Groundwater below the upper 20 feet of the surficial aquifer that has total VOC concentrations greater than 50 $\mu\text{g/L}$ across the 1,200-foot-wide lateral extent of the Site Area southern boundary.
- Comply with applicable NYSDEC standards, criteria, and guidance values (SCGs) for treated water and air emissions.

A secondary benefit of the BPGWCS is the creation of a clean-water front atop downgradient groundwater, which minimizes the potential for vapor intrusion downgradient of the Site Area.

3. Bethpage Park Groundwater Containment System Description

The BPGWCS consists of:

- A “pump-and-treat system” where groundwater is:
 - Extracted along the Plant 24 Access Road via four remedial wells
 - Conveyed to a treatment plant at McKay Field via four underground pipelines
 - Treated via air stripping to reduce concentrations of Project and Non-Project VOCs



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- Filtered to remove oxidized metals
- Returned to the aquifer via a discharge pipeline routed to a recharge basin located on the adjacent former Bethpage Navy Weapons Industrial Reserve Plant property
- A vapor-phase treatment system that reduces concentrations of Project VOCs in the air stripper off-gas prior to discharge to the atmosphere
- A groundwater monitoring network periodically monitored to assess environmental effectiveness of the BPGWCS

Major components of the BPGWCS are as follows:

- Four remedial wells (RW-1, RW-2, RW-3, and RW-4) with design pumping rates of 30 gallons per minute (gpm), 75 gpm, 75 gpm, and 30 gpm, respectively; for a total design influent flow rate of 210 gpm.
- One low-profile air stripper to remove VOCs from extracted groundwater prior to discharge to the recharge basins.
- Two bag filter units configured so that one is “operational” and the other is in “standby” mode. The system control logic automatically switches from the “operational” filter unit to the “standby” filter unit when the bag filter is full to prevent a system shutdown and the spent filters are then replaced.
- Four emission control units, two containing vapor-phase granular-activated carbon and two containing potassium permanganate-impregnated zeolite, to treat Project VOCs in the air stripper off-gas.
- The groundwater monitoring network, consisting of 35 monitoring locations, including 17 groundwater monitoring wells, four remedial wells, and 14 piezometers.

The OM&M Manual (ARCADIS 2009) provides additional information on the BPGWCS. Figure 2 shows the layout of the BPGWCS, and Figure 3 provides a schematic drawing. Figure 4 shows groundwater sampling locations that form the groundwater monitoring network. Appendix A provides construction details for the monitoring wells and piezometers.

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4. Operation and Maintenance Activities

The BPGWCS operated continuously, at either full or reduced flow, during this reporting period, with the exception of shutdown periods for routine maintenance and alarm conditions. BPGWCS operation and maintenance (O&M) activities conducted during this reporting period are summarized in Table 1 and described below:

- The BPGWCS operated at full or reduced capacity 86 out of 92 days (93% uptime).
- Based on groundwater volume recorded at the remedial well flow meters, remedial wells operated at average flow rates of 27 gpm (RW-1), 72 gpm (RW-2), 39 gpm (RW-3), and 27 gpm (RW-4). The observed average flow rates for all remedial wells were lower than their design flow rates due to approximately 5 days of downtime attributed to rehabilitation of RW-2 and RW-3, as well as alarm-related treatment system downtime. Additionally, the observed average flow rate for Remedial Well RW-3 was approximately half of the design flow rate due to an additional 5 days of rehabilitation and 31 days of downtime due to multiple motor failure conditions. Furthermore, troubleshooting to diagnose the occurrence of motor failures this quarter, as well as during other 2014 quarters, was also completed during Remedial Well RW-3 downtime. This included a site visit and electrical assessment by a representative from the motor distributor and manufacturer. Based on this assessment, it was concluded that the motor failures experienced were most likely due to overheating. Installation of motor shrouds were recommended to improve motor cooling. As described in more detail below, a new polyvinyl chloride shroud was installed at Remedial Well RW-3 on September 29, 2014 and will be installed at Remedial Well RW-2 during the fourth quarter.
- Remedial wells operated at reduced instantaneous flow rates (between 95% and 99% of design) during portions of the reporting period due to iron buildup in the pumps, influent pipelines, and valves. The reduced flow rates were corrected by adjusting the manifold globe valves and performing remedial well maintenance.
- The system was monitored either through site visits or remotely by wireless computer link-up.
- The Supervisory Control and Data Acquisition system operated as designed, and when conditions warranted (see below), the system was shutdown automatically and instantaneously, and notified plant operators of system advisories and alarms.

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- Intentional system shutdowns were as follows (see Table 1 for more information):
 - Quarterly and semi-annual treatment system maintenance (July 24, 2014).
 - Installation of a new motor in Remedial Well RW-3 to replace the motor that failed on July 25, 2014 (July 31, 2014).
 - Remedial Well RW-3 full chemical and mechanical redevelopment utilizing carbon dioxide and RW-2 chemical redevelopment utilizing carbon dioxide to improve remedial well specific capacities (August 25 to September 4, 2014).
 - Installation of a new motor and motor shroud at Remedial Well RW-3 and attempted installation of a motor shroud at Remedial Well RW-2. The work was completed at Remedial Well RW-3; however, RW-2 was installed without the motor shroud, because the shroud was too wide and would not fit past the pitless adaptor. Installation of a reconfigured motor shroud is scheduled for the fourth quarter of 2014 (September 29, 2014).
- System shutdowns due to alarm conditions were as follows (see Table 1 for more information):
 - Bag filter differential high pressure (July 5, 2014): Problem – Bag filter differential high pressure alarm resulting from a temporary issue with the automated ball valve. Solution – The bag filters were changed, the automated ball valve was inspected, and the system was restarted.
 - Motor overload at Remedial Well RW-2 (July 7, 2014): Problem – Motor overheating. Solution – The well flow rate was increased to 85 gpm to allow for improved motor cooling.
 - Motor overload at Remedial Well RW-3 (July 25, 2014): Problem – Motor failure due to overheating. Solution – Install new motor.
 - Electrical disruption (September 1, 2014): Problem – A substation went down causing an electrical disruption. Solution – The system was restarted after restoration of electric service.
 - Treatment system compliance and performance monitoring.



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5. System Monitoring Activities

The following compliance and performance monitoring activities were conducted during this reporting period (see Appendix B, Table B-1 for a summary of the compliance and performance monitoring program requirements):

- Three sampling events to collect required water samples and air samples
- Thirteen weekly site visits to monitor and record key system operational parameters

System O&M results are summarized in the following tables, graphs, and appendices:

- Operational Summary, including monitoring events, system operational days, and noteworthy site activities (Table 1)
- Summary of Influent and Effluent Water Sample Analytical Results (Tables 2 and 3, respectively). Table 3 also provides the BPGWCS treatment system removal efficiency. Appendix B includes complete validated water sample analytical results summaries for each sampling event.
- Summary of Influent and Effluent Vapor Sample Analytical Results (Tables 4 and 5, respectively). Table 5 also provides the BPGWCS treatment system removal efficiency. Appendix C includes complete, validated vapor sample analytical results for each sampling event.
- System Parameters, including flow rates, line pressures, and temperatures (Table 6).
- Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates (Table 7). Table 7 provides a breakdown of these parameters by Remedial Well and System and breaks down the VOC mass recovered and VOC recovery rates into Project, Non-Project, and total VOCs.
- Air Discharge Quality Evaluation and Summary of Air Emissions Model Output (Appendix D and Table 8, respectively).



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- Concentrations of VOCs and Metals in Remedial Well Groundwater Samples (Tables 9 and 10, respectively).
- Cumulative Total, Project, and Non-Project VOC Mass Removed (Figure 5).
- Remedial Well Total, Project, and Non-Project VOC Concentrations (Figures 6A, 6B, and 6C, respectively).
- Influent Total, Project, and Non-Project VOC Concentrations (Figure 7).
- Total, Project, and Non-Project VOC Mass Recovery Rates (Figures 8A, 8B, and 8C, respectively).

5.1 Summary of Operation, Maintenance, and Monitoring Results and Conclusions

5.1.1 System Operation and Effectiveness

BPGWCS OM&M reporting period results and conclusions are summarized below:

- Total volume of groundwater recovered and treated (Table 7):
 - Third quarter 2014: 22.8 million gallons
 - Cumulative total since system startup: 532 million gallons
- Total VOC mass recovered (Table 7 and Figure 5):
 - Third quarter 2014: 16 pounds (lbs) of VOCs
 - Cumulative total since system startup: 2,038 lbs of VOCs
- VOC mass recovered and mass removal rates (Table 7 and Figures 8A, 8B, and 8C):
 - Majority of VOCs recovered during this reporting period were Project VOCs (85% or 14 lbs)
 - Majority of Project VOCs are recovered by RW-2 (98%) and RW-3 (1.8%)

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- Majority of Non-Project VOCs are recovered by RW-4 (57%), RW-3 (24%), and RW-2 (19%).
- Treatment system influent concentrations (Table 2 and Figures 6A, 6B, 6C, and 7):
 - Project VOC influent concentrations, which ranged from 45 to 98 µg/L during the reporting period, are consistent with historical values, but are well below recent peak concentration observed in 2013 (206 µg/L). Project VOC influent concentrations have generally decreased since 2010
 - Non-Project VOC influent concentrations, which ranged from 7.5 to 18 µg/L during the reporting period, are consistent with historical values, but are below the recent peak concentration observed in 2013 (86 µg/L). Non-Project VOC influent concentrations have generally decreased since 2010
 - Total iron was detected at an anomalously high concentration of 19,500 µg/L in the influent sample collected on July 8, 2014. This total iron detection was likely due to iron precipitates in the pipeline, manifold, and/or sample tap. Total iron detected in the treatment system effluent sample collected on the same date was 580 µg/L, which is below the total iron discharge limit of 600 µg/L (Table 3)
 - Mercury has not been detected in any influent or effluent sample since system startup.
- Project VOCs in Remedial Wells RW-1, RW-3, and RW-4 (Table 9) were not detected during this reporting period above applicable SCGs, while in Remedial Well RW-2, several Project VOCs (cis-1,2-DCE, toluene, TCE, and VC) continue to be detected above applicable SCGs. Similar to total influent concentrations, Project VOC remedial well concentrations have generally decreased since 2010.
- Non-Project VOCs in all remedial wells (Table 9) were not detected above applicable SCGs during this reporting period. Similar to total influent concentrations, Non-Project VOC remedial well concentrations have generally decreased since 2010.
- Metals concentrations in remedial wells during this reporting period (Table 10) are consistent with historical metals concentrations.

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- The air stripper, air stripper off-gas treatment system, and bag filter system performed within acceptable operating ranges for this reporting period, as indicated by:
 - The air stripper VOC removal efficiency was greater than 99.9% for Project and Non-Project VOCs (Table 3).
 - Both water and air discharges complied with applicable SCGs and discharge limits (Tables 3, 5, and 8), except total iron was detected at 1,000 µg/L in the effluent sample collected on September 4, 2014, which is above the effluent discharge limit of 600 µg/L. The total iron detection was likely due to iron precipitates in the sample tap caused by build-up and flaking of iron precipitates in the bag filter, filter vessel, and discharge piping and is considered anomalous. The follow-up effluent sample collected on October 1, 2014 was analyzed with an expedited turnaround and the total iron concentration detected was 470 µg/L, which is below the effluent discharge limit of 600 µg/L (Table 3). Total iron will continue to be monitored and addressed as necessary.

5.1.2 Regulatory Status of Discharges

5.1.2.1 Air Discharge

To determine the compliance status of air discharge from the BPGWCS treatment system, the system's effluent vapor concentrations were compared to NYSDEC Division of Air Resources Air Guide-1 (DAR-1) Model Short-term Guideline Concentrations (SGCs [NYSDEC 2014]; Table 5) and the effluent vapor laboratory results were compared to a site-specific modeled annual maximum allowable stack concentration (MASC). The annual MASC was calculated during each monitoring event for individual compounds using the output from the U.S. Environmental Protection Agency (USEPA) SCREEN3 Model in conjunction with the NYSDEC DAR-1 Annual Guideline Concentrations (AGCs). A scaling factor was calculated using the SCREEN3 model with site-specific physical layout information (e.g., building dimensions, stack height, terrain) and operating data (e.g., air flow rate, temperature) inputs for each monitoring event. The scaling factor was then used to adjust (scale) the NYSDEC DAR-1 AGC to a site-specific MASC. Table 8 provides a summary of the instantaneous percent (i.e., not time-weighted) of the site-specific annual MASC for detected Project and Non-Project VOCs, as well as a summary of the cumulative

annual percent (i.e., time-weighted) of the site-specific MASC. Appendix D provides a summary of the model inputs, outputs, and backup calculations.

The BPGWCS air effluent met NYSDEC requirements throughout the reporting period, as indicated by the following:

- The measured concentrations of individual VOCs in the vapor effluent did not exceed applicable SGCs (Table 5).
- The measured concentration of individual VOCs in the vapor effluent did not exceed applicable, instantaneous MASCs, as calculated using the USEPA SCREEN 3 Model (Table 8). Similarly, the time-weighted rolling averages for the individual detected Project and Non-Project VOCs are below their respective MASCs.

5.1.2.2 Water Discharge

The BPGWCS-treated water effluent met NYSDEC regulatory requirements during the reporting period (Table 3 and Appendix B), as indicated by the following:

- The measured concentration of individual VOCs in the treated water effluent were below applicable discharge limits, per the interim State Pollutant Discharge Elimination System (SPDES) equivalency permit.
- The measured concentration of total iron and total mercury in the treated water effluent were below applicable discharge limits, except as mentioned in Section 5.1.1, per the interim SPDES equivalency permit. In addition, total mercury continues to be non-detect and has not been detected in any treated water effluent sample since system startup.

6. Environmental Effectiveness Monitoring

BPGWCS environmental effectiveness (i.e., hydraulic monitoring and groundwater quality monitoring) activities and results for this reporting period are discussed below.

6.1 Hydraulic Monitoring

6.1.1 Activities

In accordance with OM&M Manual requirements and methodologies (ARCADIS 2009), a quarterly round of groundwater hydraulic monitoring was performed during the reporting period. Specifically, depth-to-water measurements were completed on August 15, 2014 at the 33 locations forming the approved monitoring well network (Table 11 and Figure 4). Water-level data were mapped and hydraulic gradients were calculated as part of the evaluation of the hydraulic performance of the BPGWCS (Table 12).

6.1.2 Results

Figure 4 provides the configuration of the shallow potentiometric surface and the inferred horizontal groundwater flow directions on August 15, 2014 at the Site Area. The water table was approximately 2 feet lower in the third quarter of 2014 compared to the third quarter of 2013. Figure 4 indicates that groundwater under the Park is being drawn toward the remedial wells.

Vertical hydraulic gradients were also evaluated. The vertical hydraulic gradient is a measure of the potential for vertical groundwater flow between two vertically separated, closely spaced observation points (i.e., clustered or nested observation wells). The magnitude of the gradient indicates the steepness of the gradient, and the sign of the gradient indicates the direction of potential vertical flow (i.e., a positive vertical gradient indicates upward flow, while a negative vertical gradient indicates downward groundwater flow). The gradient does not provide information with respect to the rate of groundwater movement, which is affected by the hydraulic conductivity of the aquifer material through which the water is moving. Table 12 provides a summary of calculated vertical groundwater hydraulic gradients at key well pairs located along the Site Area southern boundary during the August 15, 2014 hydraulic groundwater monitoring event. The vertical hydraulic gradients generally indicate that shallow groundwater is moving downward and deeper groundwater is being drawn upward towards the remedial well screened intervals.

Figure 9 provides a cross-sectional view of vertical groundwater flow (based on groundwater levels measured on August 15, 2014), combined with a cross-section of Project VOC concentrations in groundwater above 5 µg/L (based on results from the May-June 2013 groundwater sampling round). Figure 9 indicates that groundwater



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containing Project VOCs above 5 µg/L is being drawn toward the remedial well screens of RW-1 through RW-4, which is consistent with the vertical groundwater hydraulic gradient observations.

Figure 9, in combination with Figure 4, indicate that the BPGWCS is providing effective vertical and horizontal hydraulic control of groundwater containing Project VOC concentrations above 5 µg/L; therefore, the BPGWCS is accomplishing its primary RAO.

6.2 Groundwater Quality Monitoring

6.2.1 Activities

Consistent with the OM&M Manual (ARCADIS 2009), groundwater quality monitoring was not required during this reporting period.

6.2.2 Results

Historical groundwater quality data are summarized in the following tables:

- Table 13 summarizes the results of laboratory analysis of VOCs in groundwater samples collected from the groundwater network wells to date.
- Table 14 summarizes the results of laboratory analysis of metals in groundwater samples collected from the groundwater network wells to date.

When an appropriate amount of data has been collected, trend graphs will be developed for selected wells.

6.3 Environmental Effectiveness Monitoring Conclusions

Collectively, Figures 4 and 9 indicate that the BPGWCS is operating as designed, the expected capture zone has developed, and off-site migration of groundwater containing Project VOC concentrations greater than 5 µg/L is being prevented.



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7. Recommendations

- Remove mercury from the SPDES equivalency monitoring program because mercury has not been detected in any system effluent water sample analyzed for mercury.
- Continue operating, maintaining, and monitoring the system in accordance with the OM&M Manual (ARCADIS 2009), including the current quarterly preventive maintenance program performed at Remedial Wells RW-2 and RW-3 to remove iron buildup in the wells and pipelines.
- Based on the consistent operation of the BPGWCS since July 2009, the current quarterly reporting frequency should be reduced to annual. Consistent with the NYSDEC-approved OM&M Manual (ARCADIS 2009), an annual report will be prepared to summarize system operation, performance, and monitoring data; this annual report will be prepared and submitted under the supervision of a licensed, professional engineer. Additionally, pertinent data collected for the BPGWCS will be submitted to the NYSDEC as part of the semi-annual progress reports currently completed in accordance with Section III of AOC Index #W1-0018-04-01. Upon receipt of NYSDEC approval of this recommendation, the OM&M Manual (ARCADIS 2009) will be updated to reflect this change.



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8. References

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Tables

Table 1. Operational Summary, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

MONTH	DAY																															Days Operational (1)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
2009 Total																																160
2010 Total																																352
2011 Total																																351
2012 Total																																353
2013 Total																																354
Jan-14				b	(2)	(3)	(4)b		(5)											###							(6)		(7)bbbb	b	29	
Feb-14	b				b					b		(8)				b		###*			(9)b						b				28	
Mar-14					b					(10)###**	b				b					b						b	(11)b		b		b	31
Apr-14						b		###			b				b		b						b			b	(12)	b	(13)	b	30	
May-14			b		###*/**			b			b			b		b	(14)										(15)			bb	23	
Jun-14	b			b					b					b		b	###						b					(16)b			30	
Jul-14	b				(17)b		(18)	###/b				b	b				b					b		(19)b	(20)b	b				(21)b	30	
Aug-14				b					b				b				b					b				(22)				b	26	
Sep-14	(23)b		b	###	b							b				b													(24)	b	30	
3Q 2014																																86
2014 Total																																257
TOTAL																																1,827

Legend:

- Indicates system online for at least the majority of the day.
- Indicates system operated with reduced flow rates.
- Indicates system off-line for at least the majority of the day.
- # Indicates water compliance samples were collected.
- ## Indicates water performance samples were collected.
- ** Indicates vapor compliance samples were collected.
- * Indicates vapor performance samples were collected.
- b Indicates filter bag unit changed over.
- K Indicates PPZ change-out.
- C Indicates carbon change-out.

Acronyms\Key:

- 3Q third quarter
- PPZ potassium permanganate-impregnated zeolite

Table 1. Operational Summary, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

- (1) Days in which the system was operational for the majority of the day are counted as one day.

First Quarter 2014

- (2) The system shut down at 1:15 am on January 5, 2014 due to a motor overload at Remedial Well RW-2. The motor was unable to be restarted at RW-2 and the system was restarted without RW-2 at 10:30 am on January 5, 2014. The system was offline for approximately 9 hours.
- (3) The system shut down at 2:40 am on January 6, 2014 due to a motor overload at Remedial Well RW-3. The motor was unable to be restarted at RW-3 and the system was restarted without RW-2 and RW-3 at 10:00 am on January 6, 2014. The system was offline for approximately 6.5 hours.
- (4) The system shut down at 5:20 am on January 7, 2014 due to an air stripper high sump level. The building temperature was just above freezing with ambient temperatures in the single digits. A system restart was attempted at 6:42 am but the system continued to shutdown. The system was left offline and temporary heaters were used to raise the building temperature. At 4:57 pm, the building was sufficiently heated and a system restart was attempted. It was noted that the transfer pump P-400 was only discharging 30 gpm at 60 Hertz. The system continued to shutdown and it was determined that the transfer pump would need to be replaced. The transfer pump was replaced with a spare pump and the system was restarted at 4:00 pm on January 8, 2014. The system was offline for approximately 34.5 hours.
- (5) The system shut down at 9:42 pm on January 8, 2014 due to a building sump high level. The system was left offline overnight. On the following day, it was determined that a hose to the bag filter differential pressure switch leaked and lead to the building sump high level. The water was pumped down, the hose repaired and the system was restarted without RW-2 and RW-3 at 9:15 am on January 9, 2014. The system was offline for approximately 11.5 hours.
- (6) The system shut down at 1:01 am on January 27, 2014 due to an air stripper high sump level. The system was restarted without RW-2 and RW-3 at 8:27 am on the same day. The system was offline for approximately 7.5 hours.
- (7) The system was shut down at 3:45 pm on January 30, 2014 to modify the HDPE drop pipe and install new pumps and motors at Remedial Wells RW-2 and RW-3. The system was restarted and shut down multiple times due to rapid bag filter changes. The system was restarted at 6:36 pm on the same day and was offline for approximately 3 hours.
- (8) The system was shut down at 11:13 am on February 12, 2014 for preventative maintenance and to install new bag filter influent gate valves. The system was restarted at 5:45 pm on the same day and was offline for approximately 6.5 hours.
- (9) The system was shut down at 1:09 pm on February 21, 2014 for alarm testing and was restarted at 4:46 pm on the same day. The system was offline for approximately 3.5 hours.
- (10) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.
- (11) The system shut down at 11:49 am on March 27, 2014 due to a low manifold pressure at Remedial Well RW-3. The system was restarted at 2:16 pm on the same day and was offline for approximately 2.5 hours.

Second Quarter 2014

- (12) The system shut down at 6:22 pm on April 27, 2014 due to a bag filter differential high pressure alarm resulting from multiple bag filter changes. The alarm was cleared, both of the bag filters changed and the system restarted at 9:19 am on April 28, 2014. The system was offline for approximately 17 hours.
- (13) The system was shut down at 3:36 pm on April 29, 2014 to install new gaskets at GAC-501 and adjust electric controls. The system was restarted at 5:47 pm on the same day and was offline for approximately 2.2 hours.
- (14) The system was shut down at 9:14 am on May 19, 2014 for mechanical redevelopment utilizing carbon dioxide at Remedial Well RW-2. The system was restarted without RW-2 at 10:47 am on May 23, 2014. The system was offline for approximately 97.5 hours.

Table 1. Operational Summary, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes continued:

- (15) The system was shut down at 8:47 am on May 27, 2014 to continue mechanical redevelopment utilizing carbon dioxide at Remedial Well RW-2. The system was restarted at 4:45 pm on May 30, 2014. The system was offline for approximately 80 hours.
- (16) The system shut down at 12:59 pm on June 27, 2014 due to a low manifold pressure at Remedial Well RW-3. There was no apparent cause for the alarm. The system was restarted at 2:32 pm on the same day and was offline for approximately 1.5 hours.

Third Quarter 2014

- (17) The system shut down at 4:30 am on July 5, 2014 due to a bag filter differential high pressure alarm resulting from a malfunctioning valve. The alarm was cleared, the valve was checked, the bag filter changed and the system restarted at 12:15 pm on July 5, 2014. The system was offline for approximately 7.7 hours.
- (18) The system shut down at 2:26 am on July 7, 2014 due to a motor overload alarm at Remedial Well RW-2. The alarm was cleared and the system was restarted with RW-2 at 10:09 am on the same day. The system was offline for approximately 7.8 hours. The system shut down at 12:28 pm on the same day due to the same alarm condition. The system was restarted with RW-2 online and the well flow rate was increased to 85 gpm to allow for improved motor cooling. The system was restarted at 4:55 pm on the same day and was offline for approximately 4.5 hours.
- (19) The system was shut down at 11:12 am on July 24, 2014 for preventative maintenance. The system was restarted at 4:22 pm on the same day and was offline for approximately 5.1 hours.
- (20) The system shut down at 7:24 am on July 25, 2014 due to a motor overload alarm at Remedial Well RW-3. RW-3 was unable to be restarted and the system was restarted without RW-3 at 10:57 am on the same day. The system was offline for approximately 3.5 hours.
- (21) The system was shut down at 7:26 am on July 31, 2014 to install a new motor and replacement pump at Remedial Well RW-3. The system was restarted at 1:58 pm on the same day and was offline for approximately 6.5 hours.
- (22) The system was shut down at 8:54 am on August 25, 2014 for mechanical redevelopment utilizing carbon dioxide at Remedial Well RW-3 and chemical redevelopment utilizing carbon dioxide at Remedial Well RW-2. The system was restarted at 4:53 pm on August 29, 2014 without RW-3. RW-3 remained off through September 29, 2014 due to additional mechanical redevelopment and a faulty motor. The system was offline for approximately 104 hours.
- (23) The system shut down at 12:08 pm on September 1, 2014 due to site wide electrical issues. The system was restarted at 9:53 am on September 2, 2014 and was offline for approximately 23 hours.
- (24) The system was shut down at 7:58 am on September 29, 2014 to install a new motor and motor shroud at Remedial Well RW-3 and swap the pump and install a new motor shroud at Remedial Well RW-2. The work was completed; however, RW-2 was installed without the motor shroud, since the shroud was too wide and would not fit past the pitless adaptor. The system was restarted with all of the remedial wells at 6:45 pm on the same day and was offline for approximately 11 hours.

Table 2. Summary of Influent Water Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Compound ⁽²⁾	10/07/13 (µg/L)	11/14/13 (µg/L)	12/09/13 (µg/L)	01/20/14 (µg/L)	02/18/14 (µg/L)	03/10/14 (µg/L)	04/08/14 (µg/L)	05/05/14 (µg/L)	06/19/14 (µg/L)	07/08/14 (µg/L)	9/4/14 ⁽⁵⁾ (µg/L)	10/1/14 ⁽⁶⁾ (µg/L)
Project VOCs												
1,1,1 - Trichloroethane	ND	ND										
1,1 - Dichloroethane	0.41	0.45	0.30	0.30	0.36	0.37	0.36	0.37	0.57	0.42	0.59	0.27
1,2 - Dichloroethane	ND	ND										
1,1 - Dichloroethene	ND	ND	0.20	ND	ND	0.26	0.26	ND	0.30	ND	ND	ND
Tetrachloroethene	0.34	0.35	0.34	0.48	0.24	0.22	0.36	0.41	0.28	0.30	0.31	ND
Trichloroethene	5.3	4.8	4.2	0.66	4.0	4.0	4.5	3.9	4.6	5.1	7.1	4.0
Vinyl Chloride	29	23	21	ND	24	22	22	18	32	24	30	13
cis 1,2-Dichloroethene	30	26	26	0.31	30	23	26	24	32	25	28	13
trans 1,2-Dichloroethene	ND	ND										
Benzene	ND	ND										
Toluene	24	22	22	ND	22	24	20	13	31	22	29	13
Xylenes	2.9	2.5	2.5	ND	2.5	2.5	2.2	1.7	4.1	2.6	3.2	1.5
Subtotal Project VOCs	92	79	77	1.8	83	76	76	61	105	79	98	45
Non-Project VOCs												
Dichlorodifluoromethane (Freon 12)	ND	ND										
Chlorodifluoromethane (Freon 22)	35	30	37	55	23	24	23	19	18	18	9.7	7.5
Subtotal Non-Project VOCs	35	30	37	55	23	24	23	19	18	18	9.7	7.5
Total VOCs ⁽³⁾	127	109	114	57	106	100	99	80	123	97	108	52
Inorganics												
Total Iron	710	570	240	660	270	5,020	350	26,300	380	19,500	1,820	1,040
Total Mercury	NA	ND	NA	NA								
pH ⁽⁴⁾	5.4	5.5	5.3	5.3	5.5	5.9	6.0	6.0	5.4	5.9	5.4	5.6

See notes on last page.

Table 2. Summary of Influent Water Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Notes:

- (1) Water samples collected by ARCADIS on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3 (prior to September 1, 2014) and per USEPA Method 8260C (after September 1, 2014), for iron analyses per USEPA Method 6010C and for mercury analyses per USEPA Method 7470A. The VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009). Influent water samples were collected from Water Sampling Port-5 (WSP-5); refer to Figure 3 of this OM&M Report for the schematic location of WSP-5.
- (2) Only VOCs associated with the interim SPDES equivalency program, plus Toluene, Benzene, Xylenes, non-project related Freon 12 and Freon 22, Mercury and Iron are included in this table. Complete VOC and inorganic data summary tables, including VOC TICs, are provided in Appendix B. Laboratory data qualifiers are included in the Appendix B tables.
- (3) "Total VOCs" represents the sum of individual concentrations of the compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.
- (4) Influent pH samples collected and measured in the field by ARCADIS personnel on the dates listed using an Oakton Model 300 pH/conductivity meter. pH units are standard units.
- (5) The August 2014 monthly sample from WSP-5 was collected on September 4, 2014 due to system maintenance activities throughout August.
- (6) The September 2014 monthly sample from WSP-5 was collected on October 1, 2014 due to system maintenance activities throughout September.

Acronyms/Key:

- 700** Bold data indicates that the analyte was detected at or above its reporting limit.
- 16 Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
- ASP Analytical Services Protocol
- ELAP Environmental Laboratory Approval Program
- IRM Interim remedial measure.
- NA Not analyzed.
- ND Analyte not detected at, or above its laboratory quantification limit.
- NYSDEC New York State Department of Environmental Conservation.
- NYSDOH New York State Department of Health
- OM&M Operation, maintenance and monitoring.
- SPDES State Pollutant Discharge Elimination System
- TICs Tentatively identified compounds.
- USEPA United States Environmental Protection Agency.
- VOC Volatile organic compound.
- µg/L Micrograms per liter.

Table 3. Summary of Effluent Water Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Compound ⁽²⁾	Discharge Limit ⁽³⁾ (µg/L)	10/07/13	11/14/13	12/09/13	01/20/14	02/18/14	03/10/14	04/08/14	05/05/14	06/19/14	07/08/14	9/4/14 ⁽⁷⁾	10/1/14 ⁽⁸⁾
		(µg/L)	(µg/L)										
Project VOCs													
1,1,1 - Trichloroethane	5	ND	ND										
1,1 - Dichloroethane	5	ND	ND										
1,2 - Dichloroethane	5	ND	ND										
1,1 - Dichloroethene	5	ND	ND										
Tetrachloroethene	5	ND	ND										
Trichloroethene	5	ND	ND										
Vinyl Chloride	5	ND	ND										
cis 1,2-Dichloroethene	5	ND	ND										
trans 1,2-Dichloroethene	5	ND	ND										
Benzene	5	ND	ND										
Toluene	5	ND	ND										
Xylenes	5	ND	ND										
Subtotal Project VOCs	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Project VOCs													
Dichlorodifluoromethane (Freon 12)	5	ND	ND										
Chlorodifluoromethane (Freon 22)	5	ND	ND										
Subtotal Non-Project VOCs	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total VOCs ⁽⁴⁾	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Treatment Efficiency ⁽⁵⁾	--	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%
Inorganics													
Total Iron	600	540	360	270	430	250	330	260	280	520	580	1,000⁽⁹⁾	470
Total Mercury	250	ND	ND										
pH ⁽⁶⁾	5.5 - 8.5	6.8	6.5	6.6	5.5	6.3	6.8	6.3	7.3	7.4	6.3	6.5	6.8

See notes on last page.

Table 3. Summary of Effluent Water Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Notes:

- (1) Water samples collected by ARCADIS on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3 (prior to September 1, 2014) and per USEPA Method 8260C (after September 1, 2014), for iron analyses per USEPA Method 6010C and for mercury analyses per USEPA Method 7470A. The VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009). Effluent water samples were collected from Water Sampling Port-7 (WSP-7); refer to Figure 3 of this OM&M Report for the location of WSP-7.
- (2) Only VOCs associated with the interim SPDES equivalency program, including Toluene, Benzene, Xylenes, non-project related Freon 12 and Freon 22, Mercury and Iron are included in this table. Complete VOC and inorganic data summary tables, including VOC TICs, are provided in Appendix B. Laboratory data qualifiers are included in the Appendix B tables.
- (3) Discharge limits per the interim SPDES equivalency program or Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) Quality Standards and Guidance Values and Groundwater Effluent Limitations, if the compound is not part of the interim SPDES equivalency program.
- (4) "Total VOCs" represents the sum of individual concentrations of compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.
- (5) Treatment efficiency was calculated by dividing the difference between the influent and effluent total VOC concentrations by the influent total VOC concentration.
- (6) Effluent pH samples collected and measured in the field by ARCADIS personnel on the dates listed using an Oakton Model 300 pH/conductivity meter. pH units are standard units.
- (7) The August 2014 monthly sample from WSP-5 was collected on September 4, 2014 due to system maintenance activities
- (8) The September 2014 monthly sample from WSP-5 was collected on October 1, 2014 due to system maintenance activities
- (9) The September 4, 2014 iron concentration exceeded its discharge limit of 600 µg/l. The exceedance is believed to be the result of iron precipitates in the sample tap. The follow-up sample collected on October 1, 2014 was analyzed with an expedited turnaround and total iron was below the discharge limit of 600 µg/l.

Acronyms/Key:

- Bold box indicates value is greater than discharge criterion.
- 700** Bold data indicates that the analyte was detected at or above its reporting limit.
- 16 Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
- ASP Analytical Services Protocol.
- ELAP Environmental Laboratory Approval Program
- IRM Interim remedial measure.
- ND Analyte not detected at, or above its laboratory quantification limit.
- NYSDEC New York State Department of Environmental Conservation.
- NYSDOH New York State Department of Health
- OM&M Operation, maintenance, and monitoring.
- SPDES State Pollutant Discharge Elimination System
- TICs Tentatively identified compounds.
- USEPA United States Environmental Protection Agency.
- VOC Volatile organic compound.
- µg/L Micrograms per liter.
- Not applicable.

Table 4. Summary of Influent Vapor Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Compound ⁽²⁾	11/14/2013 (µg/m ³)	2/18/2014 (µg/m ³)	5/5/2014 (µg/m ³)	10/1/2014 ⁽⁴⁾ (µg/m ³)
Project VOCs				
1,1,1 - Trichloroethane	1.0	0.95	0.90	0.83
1,1 - Dichloroethane	5.4	5.8	5.4	4.9
1,2 - Dichloroethane	ND	ND	ND	ND
1,1 - Dichloroethene	2.0	3.1	3.6	1.6
Tetrachloroethene	3.6	4.2	3.6	2.9
Trichloroethene	66	62	62	59
Vinyl Chloride	320	360	350	250
cis 1,2-Dichloroethene	470	530	480	240
trans 1,2-Dichloroethene	ND	ND	ND	ND
Benzene	1.9	1.1	ND	ND
Toluene	370	400	310	240
Xylenes	41	51	37	25
Subtotal Project VOCs	1,281	1,418	1,253	824
Non-Project VOCs				
Dichlorodifluoromethane (Freon 12)	2.4	2.6	2.3	2.4
Chlorodifluoromethane (Freon 22)	400	290	140	61
Subtotal Non-Project VOCs	402	293	142	63
Total VOCs ⁽³⁾	1,683	1,711	1,395	888

See notes on last page.

Table 4. Summary of Influent Vapor Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Notes:

- (1) Vapor samples collected by ARCADIS on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15. A VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009). Influent samples were collected at Vapor Sampling Port-1 (VSP-1); refer to Figure 3 of this OM&M Report for the location of VSP-1.
- (2) Only VOCs that are associated with the interim SPDES equivalency program, Toluene, Benzene, Xylenes, and non-project related Freon 12 and Freon 22 are included in this table. Complete VOC summary tables, including VOC TICs, are provided in Appendix C. Laboratory data qualifiers are included in the Appendix C tables.
- (3) "Total VOCs" represents the sum of individual concentrations of compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.
- (4) The September 2014 quarterly sample from VSP-1 was collected on October 1, 2014 due to system maintenance activities throughout September.

Acronyms\Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
ELAP	Environmental Laboratory Approval Program
IRM	Interim remedial measure.
ND	Analyte not detected at or above its laboratory reporting limit.
NYSDOH	New York State Department of Health
OM&M	Operation, maintenance, and monitoring.
SPDES	State Pollutant Discharge Elimination System
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
µg/m ³	Micrograms per cubic meter.

Table 5. Summary of Effluent Vapor Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Compound ⁽²⁾	Discharge Limit ⁽³⁾ (µg/m ³)	11/14/2013	3/10/2014 ⁽⁹⁾	5/5/2014	10/1/2014 ⁽⁹⁾
		(µg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)
Project VOCs					
1,1,1 - Trichloroethane	9,000	ND	ND	ND	ND
1,1 - Dichloroethane	NS	1.4	5.7	4.3	5.7
1,2 - Dichloroethane	NS	ND	ND	ND	ND
1,1 - Dichloroethene	380 ⁽⁴⁾	ND	0.77	ND	1.6
Tetrachloroethene	1,000	ND	ND	ND	ND
Trichloroethene	14,000	ND	2.3	1.1	2.3
Vinyl Chloride	180,000	2.6	14	4.7	55
cis 1,2-Dichloroethene	190,000 ⁽⁵⁾	4.6	58	17	140
trans 1,2-Dichloroethene	NS	ND	ND	ND	ND
Benzene	1,300	0.91	ND	ND	ND
Toluene	37,000	19	33	17	20
Xylenes	4,300	ND	2.5	ND	ND
Subtotal Project VOCs	NA	29	116	44	225
Non-Project VOCs					
Dichlorodifluoromethane (Freon 12)	NS	2.5	2.8	2.4	2.3
Chlorodifluoromethane (Freon 22)	NS	400	110	93	29
Subtotal Non-Project VOCs	NA	403	113	95	31
Total VOCs ⁽⁶⁾	NA	431	229	140	256
Treatment Efficiency (Total VOCs) ⁽⁷⁾	NA	74.4%	86.6%	90.0%	71.2%
Treatment Efficiency (Project VOCs) ⁽⁸⁾	NA	97.8%	91.8%	96.5%	72.8%

See notes on last page.

Table 5. Summary of Effluent Vapor Sample Analytical Results, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Notes:

- (1) Vapor samples collected by ARCADIS on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15. A VOC analyte list is provided in the DRAFT Groundwater IRM OM&M Manual (ARCADIS 2009). Effluent samples were collected at Vapor Sampling Port-5 (VSP-5); refer to Figure 3 of this OM&M Report for the location of VSP-5.
- (2) Only VOCs that are associated with the interim SPDES equivalency program, Toluene, Benzene, Xylenes, and non-project related Freon 12 and Freon 22 are included in this table. Complete VOC summary tables, including VOC TICs, are provided in Appendix C. Laboratory data qualifiers are included in the Appendix C tables.
- (3) Discharge limit is compound-specific SGC per the NYSDEC DAR-1 AGC/SGC tables revised February 28, 2014.
- (4) An SGC was not provided in the DAR-1 AGC/SGC Tables, dated February 28, 2014. An interim SGC was developed based on guidance of the New York State DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants, 1991 edition. Specifically for 1,1-dichloroethene, which is not defined as provided in Section IV.A.2.b.1 a high-toxicity compound, the Interim SGC = (smaller of Time Weighted Average [TWA] - Threshold Limit Value or TWA - Recommended Exposure Limit)/4.2. or $1,600 \mu\text{g}/\text{m}^3 / 4.2 = \text{approximately } 380 \mu\text{g}/\text{m}^3$. An interim SGC was developed for this compound because it has a moderate toxicity rating, as specified in the DAR-1 AGC/SGC Tables, dated February 28, 2014.
- (5) An SGC was not provided in the DAR-1 AGC/SGC Tables, dated February 28, 2014. An interim SGC was developed based on guidance provided in Section IV.A.2.b.1 of the New York State DAR-1 Guidelines for the Control of Toxic Ambient Air Contaminants, 1991 edition. Specifically for cis-1,2 dichloroethene, which is not defined as a high-toxicity compound, the interim SGC = (smaller of Time Weighted Average [TWA] - Threshold Limit Value or TWA - Recommended Exposure Limit)/4.2 or $790,000 \mu\text{g}/\text{m}^3 / 4.2 = \text{approximately } 190,000 \mu\text{g}/\text{m}^3$. An interim SGC was developed for this compound because it has a moderate toxicity rating, as specified in the DAR-1 AGC/SGC Tables, dated February 28, 2014.
- (6) "Total VOCs" represents the sum of individual concentrations of all compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.
- (7) Treatment efficiency was calculated by dividing the difference between the influent and effluent Total VOC concentrations by the influent Total VOC concentration. Treatment efficiency is only calculated when there is a corresponding influent sample.
- (8) Treatment efficiency was calculated by dividing the difference between the influent and effluent total Project VOC concentrations by the influent total Project VOC concentration. Treatment efficiency is only calculated when there is a corresponding influent sample.
- (9) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.
- (10) The September 2014 quarterly sample from VSP-5 was collected on October 1, 2014 due to system maintenance activities throughout September.

Acronyms/Key:

700	Bold data indicates that the analyte was detected at or above its reporting limit.
16	Data that is not bold indicates analyte detected but below its reporting limit; the value is estimated.
AGC	Annual guideline concentration.
DAR-1	Division of Air Resources Air Guidance-1
ELAP	Environmental Laboratory Approval Program
IRM	Interim remedial measure.
NA	Not applicable.
ND	Analyte not detected at or above its laboratory reporting limit.
NS	Guideline concentrations not specified in the NYSDEC DAR-1 AGC/SGC tables revised September 10, 2007. An interim SGC was not developed for these compounds because they have low toxicity ratings in the NYSDEC DAR-1 AGC/SGC tables revised February 28, 2014.
NYSDEC	New York State Department of Environmental Conservation.
NYSDOH	New York State Department of Health
OM&M	Operation, maintenance, and monitoring.
SGC	Short-term Guidance Concentration
SPDES	State Pollutant Discharge Elimination System
TICs	Tentatively identified compounds.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
$\mu\text{g}/\text{m}^3$	Micrograms per cubic meter.

Table 6. Summary of System Parameters, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Date ⁽¹⁾	Water Flow Rates						Water Pressures ⁽²⁾					Air Flow Rate ⁽²⁾	Air Pressures ⁽⁵⁾				Air Temp. ⁽⁵⁾	
	Remedial Well ⁽²⁾				Combined Influent ⁽³⁾	Effluent ⁽²⁾	Remedial Well Effluent ⁽⁴⁾				Effluent		Effluent	ECU Influent				Effluent
	RW-1 (gpm)	RW-2 (gpm)	RW-3 (gpm)	RW-4 (gpm)			RW-1 (psi)	RW-2 (psi)	RW-3 (psi)	RW-4 (psi)		Effluent (psi)		Effluent (scfm)	GAC-501 (iwc)	GAC-502 (iwc)	PPZ-601 (iwc)	
10/07/13	34.0	75.0	78.5	31.8	220	246	55	20	37	56	9	1,868	8.4	9.0	5.5	4.5	0.0	536
11/14/13	30.4	81.2	76.5	30.3	218	259	57	26	42	57	8.5 ⁽⁶⁾	1,970	8.5 ⁽⁶⁾	9.5 ⁽⁶⁾	6.0 ⁽⁶⁾	4.5 ⁽⁶⁾	0.0 ⁽⁶⁾	530 ⁽⁶⁾
12/09/13	30.8	78.0	77.0	30.3	216	251	57	24	40	57	9	1,941	8.5	9.5	5.5	4.5	0.0	530
01/20/14	30.3	0.0	0.0	30.2	60	71	58	0.0	0.0	57	6	2,070	9.5	10.8	6.5	5.0	0.0	527
02/18/14	30.9	83.0	84.4	29.6	228	239	57	50	47	57	9	2,013	6.5	7.7	6.0	4.5	0.0	514
03/10/14	30.6	74.9	84.8	30.4	221	252	57	59	41	56	8	1,974	6.5	7.5	5.8	4.4	0.0	531
04/08/14	30.4	75.6	80.6	30.4	217	247	58	49	44	56	11	1,947	6.5	7.5	5.7	4.4	0.0	534
05/05/14	29.7	74.6	79.8	30.2	214	246	58	46	40	57	11	1,963	6.8	7.8	6.0	4.6	0.0	539
06/19/14	29.6	74.5	74.8	30.0	209	204	59	54	49	57	9	1,992	7.6 ⁽⁷⁾	8.7 ⁽⁷⁾	6.7 ⁽⁷⁾	5.1 ⁽⁷⁾	0.0 ⁽⁷⁾	540 ⁽⁷⁾
07/08/14	30.3	85.6	75.3	30.2	221	245	58	27	44	57	30	1,883	7.3	8.2	6.5	5.0	0.0	547
09/04/14	30.3	76.1	0.0	30.4	137	178	58	35	0.0	57	5	1,801	8.6	9.1	7.3	5.2	0.0	550
10/01/14	30.3	82.9	75.7	30.4	219	254	58	45	51	57	19	1,900	4.6 ⁽⁸⁾	5.2 ⁽⁸⁾	3.0 ⁽⁸⁾	1.0 ⁽⁸⁾	0.0 ⁽⁸⁾	522 ⁽⁸⁾

See notes on last page.

Table 6. Summary of System Parameters, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

- (1) Operational data collected by ARCADIS on days noted. Parameters listed were typically recorded during compliance monitoring events. Data in this table correspond to approximately the past year of system operation.
- (2) Instantaneous parameters obtained from the SCADA HMI: Water Flow Rate, Water Pressure, Air Flow Rate.
- (3) Combined influent water-flow rate is the sum of individual well flow rates via the SCADA System.
- (4) Remedial Well effluent pressure readings measured at the influent manifold within the treatment system building.
- (5) Instantaneous values from field-mounted instruments
- (6) Values collected on November 11, 2013 during the weekly site visit. No values collected on day of sampling.
- (7) Values collected on June 17, 2014 during the weekly site visit. No values collected on day of sampling.
- (8) Values collected on September 30, 2014 during the weekly site visit. No values collected on day of sampling.

Acronyms\Key:

ECU	Emission control unit.
gpm	Gallons per minute.
HMI	Human-machine interface.
iwc	Inches of water column.
psi	Pounds per square inch.
°R	Degrees Rankine.
SCADA	Supervisory Control and Data Acquisition
scfm	Standard cubic feet per minute.
Temp.	Temperature.

Table 7. Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Operating Period ⁽¹⁾	Volume of Groundwater Recovered (x1,000 gal) ⁽²⁾					VOC Mass Recovered (lbs) ⁽³⁾															VOC Mass Recovery Rate (lbs/day) ⁽⁴⁾																			
						Total VOCs ⁽⁵⁾					Project VOCs ⁽⁶⁾					Non-Project VOCs ⁽⁷⁾					Total VOCs ⁽⁵⁾					Project VOCs ⁽⁶⁾					Non-Project VOCs ⁽⁷⁾									
	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total
System Pilot Test, Shakedown and Startup Totals ⁽⁸⁾																																								
	137	270	251	150	808	NA	NA	NA	NA	1.1	NA	NA	NA	NA	1.0	NA	NA	NA	NA	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2009 Totals																																								
07/21/09 - 12/30/09	6,592	13,838	16,445	6,574	43,449	0.17	275	53	14	342	0.17	273	19	0.20	293	<0.01	0.56	35	13	48	<0.01	1.7	0.33	0.086	2.1	<0.01	1.7	0.12	<0.01	1.8	<0.01	<0.01	0.22	0.080	0.30					
2010 Totals																																								
12/30/09 - 01/05/11	15,726	35,127	38,160	15,689	104,702	0.56	172	412	89	672	0.56	171	28	0.10	200	<0.01	0.17	383	89	469	<0.01	0.46	1.1	0.24	1.8	<0.01	0.46	0.075	<0.01	0.54	<0.01	<0.01	1.0	0.24	1.3					
2011 Totals																																								
01/05/11 - 01/09/12	15,218	36,570	37,682	15,196	104,666	0.36	167	271	78	516	0.36	167	35	0.09	203	<0.01	1.1	236	78	314	<0.01	0.45	0.73	0.21	1.4	<0.01	0.45	0.095	<0.01	0.55	<0.01	<0.01	0.64	0.21	0.85					
2012 Totals																																								
01/09/12 - 01/07/13	15,260	35,178	36,111	15,336	101,885	0.28	114	113	40	267	0.25	113	12	0.39	126	<0.01	1.5	101	40	141	<0.01	0.31	0.31	0.11	0.73	<0.01	0.31	0.032	<0.01	0.35	<0.01	<0.01	0.28	0.11	0.39					
2013 Totals																																								
01/07/13 - 01/06/14	15,968	37,514	36,622	16,036	106,140	0.14	111	41	18	171	0.14	110	4.3	0.36	113	<0.01	1.6	37	18	57	<0.01	0.30	0.11	0.050	0.47	<0.01	0.30	0.012	<0.01	0.31	<0.01	<0.01	0.10	0.049	0.16					
January 2014 through March 2014 Totals																																								
01/06/14 - 02/01/14	1,090	176	197	1,090	2,553	<0.01	0.50	0.095	0.77	1.4	<0.01	0.50	0.014	0.021	0.54	<0.01	<0.01	0.080	0.75	0.83	<0.01	0.019	<0.01	0.030	0.054	<0.01	0.019	<0.01	<0.01	0.021	<0.01	<0.01	<0.01	0.029	0.032					
02/01/14 - 03/01/14	1,270	3,174	3,390	1,270	9,104	<0.01	9.1	1.6	0.90	12	<0.01	8.9	0.25	0.024	9.2	<0.01	0.16	1.4	0.87	2.4	<0.01	0.33	0.057	0.032	0.43	<0.01	0.32	<0.01	<0.01	0.33	<0.01	<0.01	0.050	0.031	0.086					
03/01/14 - 04/01/14	1,421	3,553	3,850	1,421	10,245	<0.01	10	1.8	1.0	13	<0.01	10	0.28	0.027	10	<0.01	0.18	1.6	0.98	2.8	<0.01	0.32	0.058	0.032	0.42	<0.01	0.32	<0.01	<0.01	0.32	<0.01	<0.01	0.052	0.032	0.090					
Subtotal Jan - Mar 2013 ⁽¹⁰⁾	3,781	6,903	7,437	3,781	21,902	0.021	20	3.5	2.7	26	0.021	19	0.54	0.072	20	<0.01	0.34	3.1	2.6	6.0	<0.01	0.24	0.041	0.031	0.31	<0.01	0.22	<0.01	<0.01	0.24	<0.01	<0.01	0.036	0.031	0.071					
April 2014 through June 2014 Totals																																								
04/01/14 - 05/01/14	1,348	3,371	3,371	1,348	9,438	<0.01	7.8	1.3	0.79	9.9	<0.01	7.7	0.23	0.025	8.0	<0.01	0.12	1.1	0.77	2.0	<0.01	0.26	0.044	0.026	0.33	<0.01	0.26	<0.01	<0.01	0.27	<0.01	<0.01	0.037	0.026	0.067					
05/01/14 - 06/01/14	1,086	2,265	2,530	1,086	6,967	<0.01	5.2	1.0	0.64	6.8	<0.01	5.1	0.17	0.020	5.3	<0.01	0.079	0.82	0.62	1.5	<0.01	0.17	0.032	0.021	0.22	<0.01	0.16	<0.01	<0.01	0.17	<0.01	<0.01	0.026	0.020	0.048					
06/01/14 - 07/01/14	1,379	3,446	3,117	1,379	9,321	<0.01	7.9	1.2	0.81	9.9	<0.01	7.8	0.21	0.026	8.0	<0.01	0.12	1.0	0.79	1.9	<0.01	0.26	0.040	0.027	0.33	<0.01	0.26	<0.01	<0.01	0.27	<0.01	<0.01	0.033	0.026	0.063					
Subtotal April - June 2014 ⁽¹¹⁾	3,813	9,082	9,018	3,813	25,726	0.020	21	3.5	2.2	27	0.020	21	0.61	0.071	21	<0.01	0.32	2.9	2.2	5.4	<0.01	0.23	0.039	0.025	0.30	<0.01	0.23	<0.01	<0.01	0.23	<0.01	<0.01	0.032	0.024	0.059					
July 2014 through September 2014 Totals																																								
07/01/14 - 08/01/14	1,330	3,412	2,458	1,361	8,561	<0.01	4.8	0.40	0.50	5.7	<0.01	4.6	0.12	0.019	4.7	<0.01	0.16	0.28	0.48	0.92	<0.01	0.15	0.013	0.016	0.18	<0.01	0.15	<0.01	<0.01	0.15	<0.01	<0.01	<0.01	0.015	0.030					
08/01/14 - 09/01/14	1,258	3,070	2,608	1,228	8,164	<0.01	4.3	0.42	0.45	5.2	<0.01	4.2	0.12	0.017	4.3	<0.01	0.15	0.30	0.43	0.88	<0.01	0.14	0.014	0.015	0.17	<0.01	0.14	<0.01	<0.01	0.14	<0.01	<0.01	0.010	0.014	0.028					
09/01/14 - 10/01/14	1,315	3,287	162	1,315	6,079	<0.01	4.6	0.026	0.48	5.1	<0.01	4.5	<0.01	0.019	4.5	<0.01	0.16	0.019	0.46	0.64	<0.01	0.15	<0.01	0.016	0.17	<0.01	0.15	<0.01	<0.01	0.15	<0.01	<0.01	<0.01	0.015	0.021					
Subtotal July - September 20 ⁽¹²⁾	3,903	9,769	5,228	3,904	22,804	0.011	14	0.85	1.4	16	0.011	13	0.24	0.055	14	<0.01	0.47	0.60	1.4	2.4	<0.01	0.15	<0.01	0.016	0.17	<0.01	0.14	<0.01	<0.01	0.15	<0.01	<0.01	<0.01	0.015	0.026					
2014 Totals ⁽¹³⁾	11,497	25,754	21,683	11,498	70,432	0.052	55	7.9	6.3	69	0.052	53	1.4	0.20	55	<0.01	1.1	6.6	6.2	14	<0.01	0.21	0.029	0.024	0.26	<0.01	0.20	<0.01	<0.01	0.21	<0.01	<0.01	0.025	0.023	0.052					
Total ⁽¹⁴⁾	80,398	184,251	186,954	80,479	532,082	1.6	894	898	245	2,038	1.5	887	99	1.3	991	<0.01	6.0	799	244	1,043	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--					

0.1% 97.7% 1.8% 0.4% 0.849 ##### 19.0% 24.3% 56.7% 0.151

See notes on next page.

Table 7. Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

- (1) Represents operating period between consecutive monitoring events.
- (2) Volume of groundwater recovered is based on individual local well totalized flow readings. Listed value is the difference between totalized flow values recorded between consecutive monitoring events. The total groundwater recovered during a given operating period is the sum of the individual well flow totals. Values shown are rounded to the nearest gallon, but should only be considered accurate to two significant figures to account for error associated with field measurements.
- (3) Mass recovered per well was calculated by multiplying the Total VOC concentration from the most recent sampling event by the number of gallons extracted during the reporting period. The total amount recovered during a given operating period is the sum of masses recovered from each of the individual wells. Values less than ten pounds are presented using two significant figures and values greater than ten pounds have been rounded to the nearest whole number; however, these values should only be considered accurate to two significant figures to account for error associated with field measurements and analytical data.
- (4) Mass recovery rates were calculated by dividing the total mass recovered for each well and for the system by the number of days in the respective operating period. Values are presented using two significant figures.
- (5) "Total VOCs" represents the sum of individual concentrations of the VOCs detected.
- (6) "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethylene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and xylenes-o,m, p.
- (7) "Non-Project VOCs" represents the difference between Total VOCs and Project VOCs.
- (8) Values based on operational data recorded prior to system startup on July 21, 2009.
- (9) Starting with the January 2013 site visit the totalized water flow readings are recorded from the SCADA HMI.
- (10) The volume of groundwater recovered and mass recovered calculations represent the operational period between January 6, 2014 and April 1, 2014.
- (11) The volume of groundwater recovered and mass recovered calculations represent the operational period between April 1, 2014 and July 1, 2014.
- (12) The volume of groundwater recovered and mass recovered calculations represent the operational period between July 1, 2014 and October 1, 2014.
- (13) The volume of groundwater recovered and mass recovered calculations represent the operational period between January 6, 2014 and October 1, 2014.
- (14) "Total" refers to the amounts removed by the Operable Unit 3 Bethpage Park Groundwater Containment System.

Acronyms/Key:

IRM	Interim Remedial Measure.
gal	Gallons.
HMI	Human-machine interface.
lbs	Pounds.
lbs/day	Pounds per day.
--	Not applicable.
SCADA	Supervisory Control and Data Acquisition
VOC	Volatile organic compound.
<	Less than.

Table 8. Summary of Air Emissions Model Output, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	AGC ⁽¹⁾ (µg/m ³)	Percent of MASC Per Event ⁽²⁾				Percent AGC ⁽³⁾
		11/14/13	3/10/2014 ⁽⁴⁾	5/5/14	10/1/14 ⁽⁵⁾	
1,1,1 - Trichloroethane	5,000	0.00%	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethane	0.63	0.03%	0.14%	0.10%	0.14%	0.10%
1,2 - Dichloroethane	0.038	0.00%	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethene	200	0.00%	0.00%	0.00%	0.00%	0.00%
Acetone	30,000	0.00%	0.00%	0.00%	0.00%	0.00%
Carbon Disulfide	700	0.00%	0.00%	0.00%	0.00%	0.00%
Chloroform	14.7	1.04%	6.45%	0.02%	0.02%	1.96%
Ethylbenzene	1,000	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (o)	100	0.00%	0.00%	0.00%	0.00%	0.00%
Xylenes (m,p)	100	0.00%	0.00%	0.00%	0.00%	0.00%
Methylene Chloride	60	0.00%	0.00%	0.00%	0.00%	0.00%
Tetrachloroethene	4.0	0.00%	0.00%	0.00%	0.00%	0.00%
Trichloroethene	0.2	0.00%	0.00%	0.08%	0.18%	0.07%
Vinyl Chloride	0.068	0.36%	1.96%	1.06%	12.46%	4.80%
cis 1,2 Dichloroethene	63	0.00%	0.01%	0.00%	0.03%	0.01%
trans 1,2 Dichloroethene	63	0.00%	0.00%	0.00%	0.00%	0.00%
Benzene	0.13	0.11%	0.00%	0.00%	0.00%	0.03%
Toluene	5,000	0.00%	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	5,000	0.00%	0.00%	0.00%	0.00%	0.00%
Dichlorodifluoromethane (Freon 12)	12,000	0.00%	0.00%	0.00%	0.00%	0.00%
Chlorodifluoromethane (Freon 22)	50,000	0.00%	0.00%	0.00%	0.00%	0.00%

See notes on last page

Table 8. Summary of Air Emissions Model Output, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

- (1) Compound-specific AGC values per the NYSDEC DAR-1 AGC/SGC tables, revised February 28, 2014. NYSDEC DAR-1 AGCs were scaled using the results of a site-specific annual USEPA SCREEN 3 model to calculate the annual MASC per monitoring event.
- (2) Percent of AGC (or Percent MASC) was calculated by dividing the actual effluent concentration by the site-specific annual MASC. Detailed calculations are included in Appendix D.
- (3) Percent AGC is the 12-month average at the end of the reporting period. The Percent AGC was calculated by time-weighting the "Percent MASCs" for the individual sampling events over the past year. MASCs are typically calculated once per quarter, thus the MASCs for each month within a quarter are assumed to be the same.
- (4) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.
- (5) Sample VSP-5 was taken on October 1, 2014 due to system maintenance during the third quarter of 2014.

Acronyms/Key:

AGC	Annual Guideline Concentration.
DAR-1	Division of Air Resources Air Guidance-1.
MASC	Maximum allowable stack concentration.
NYSDEC	New York State Department of Environmental Conservation.
SGC	Short-term Guideline Concentration.
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

COMPOUND (µg/L)	Sample Location: Sample Date:	RW-1 1/7/2013	RW-1 4/1/2013	RW-1 7/1/2013	RW-1 11/14/2013	RW-1 2/18/2014	RW-1 5/5/2014	RW-1 ⁽⁴⁾ 10/1/2014
NYSDEC								
SCGs								
1,1,1-Trichloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloroethane	0.6	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	1	< 0.7 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromoform	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	60	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon tetrachloride	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)	NE	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	7	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-dichloroethene	5	0.34 J	0.40 J	0.24 J	0.25 J	< 5.0 U	0.21 J	< 5.0 U
cis-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Methyl N-Butyl Ketone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert-Butyl Ether	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Styrene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Toluene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,2-dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethylene	5	0.86 J	0.70 J	0.77 J	0.77 J	0.67 J	0.41 J	0.34 J
Trichlorofluoromethane (Freon 11)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride	2	< 2 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Xylene-o	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Xylenes - m,p	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Total VOCs ⁽²⁾		1.2	1.1	1.0	1.0	0.67	0.62	0.34
Project VOCs ⁽³⁾		1.2	1.1	1.0	1.0	0.67	0.62	0.34

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

COMPOUND (µg/L)	Sample Location: Sample Date:	RW-2 1/7/2013	RW-2 4/1/2013	RW-2 (dup.) 4/1/2013	RW-2 7/1/2013	RW-2 11/14/2013	RW-2 2/18/2014	RW-2 5/5/2014	RW-2 10/1/2014
NYSDEC									
SCGs									
1,1,1-Trichloroethane	5	0.41 J	0.39 J	0.37 J	0.27 J	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	5	1.6 J	1.8 J	2.0 J	1.5 J	1.0 J	1.1 J	1.1 J	0.85 J
1,1-Dichloroethene	5	0.82 J	0.85 J	0.83 J	0.77 J	0.54 J	0.79 J	0.78 J	< 5.0 U
1,2-Dichloroethane	0.6	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane	1	< 5 U	< 5.0 U	0.47 J	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	1	< 0.7 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromoform	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	60	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon tetrachloride	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)	NE	0.33 J	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	7	2.1 J	2.2 J	2.3 J	2.2 J	2.0 J	2.2 J	1.7 J	2.8 J
Chloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-dichloroethene	5	160	170 D	180 D	140	100	130	100	51
cis-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	5	2.3 J	3.6 J	3.7 J	3.1 J	2.9 J	4.0 J	2.5 J	2.9 J
Methyl N-Butyl Ketone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert-Butyl Ether	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Styrene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	5	0.38 J	0.34 J	0.36 J	0.33 J	0.25 J	0.25 J	< 5.0 U	< 5.0 U
Toluene	5	82	110	110	95	84	85	63	46
trans-1,2-dichloroethene	5	< 5 U	0.26 J	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethylene	5	18	16	16	17	13	11	12	12
Trichlorofluoromethane (Freon 11)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride	2	75	110	110	100	88	99	87	48
Xylene-o	5	3.2 J	4.1 J	4.5 J	3.1 J	3.1 J	4.0 J	3.2 J	2.0 J
Xylenes - m,p	5	5.3	8.6	8.9	5.6	6.8	6.8	5.4	3.1 J
Total VOCs ⁽²⁾		351	428	439	369	302	344	277	169
Project VOCs ⁽³⁾		347	422	433	364	297	338	272	163

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

COMPOUND (µg/L)	Sample Location: Sample Date:	RW-3 1/7/2013	RW-3 4/1/2013	RW-3 7/1/2013	RW-3 11/14/2013	RW-3 2/18/2014	RW-3 5/5/2014	RW-3 10/1/2014
NYSDEC								
SCGs								
1,1,1-Trichloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	5	0.21 J	< 5.0 U	0.21 J	0.23 J	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloroethane	0.6	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	1	< 0.7 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromoform	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	60	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon tetrachloride	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)	NE	190	130	98	61	45	34	9.0
Chloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	7	4.9 J	3.5 J	3.6 J	2.5 J	3.8 J	4.9 J	4.8 J
Chloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-dichloroethene	5	12	9.4	7.7	6.1	4.9 J	4.3 J	2.8 J
cis-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)	5	< 5 U	< 5.0 U	< 5.0 U	0.33 J	< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Methyl N-Butyl Ketone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert-Butyl Ether	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Styrene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	5	0.33 J	0.29 J	0.38 J	0.28 J	0.30 J	0.36 J	< 5.0 U
Toluene	5	< 5 U	< 5.0 U	< 5.0 U	0.31 J	< 5.0 U	< 5.0 U	0.35 J
trans-1,2-dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethylene	5	5.1	4.3 J	4.5 J	3.9 J	3.6 J	3.6 J	2.6 J
Trichlorofluoromethane (Freon 11)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)	5	< 5 U	< 5.0 U	0.30 J	< 5.0 U	0.34 J	< 5.0 U	< 5.0 U
Vinyl Chloride	2	0.25 J	0.24 J	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Xylene-o	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Xylenes - m,p	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Total VOCs ⁽²⁾		213	148	115	75	58	47	19.6
Project VOCs ⁽³⁾		18	14	13	11	8.8	8.3	5.8

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

COMPOUND (µg/L)	Sample Location: Sample Date:	RW-4 1/7/2013	RW-4 4/1/2013	RW-4 7/1/2013	RW-4 11/14/2013	RW-4 2/18/2014	RW-4 5/5/2014	RW-4 10/1/2014
NYSDEC								
SCGs								
1,1,1-Trichloroethane	5	< 5 U	< 5.0 U	< 5.0 U	0.23 J	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane	5	0.46 J	0.52 J	0.45 J	0.38 J	0.38 J	0.40 J	0.36 J
1,1-Dichloroethene	5	0.24 J	0.22 J	< 5.0 U	0.25 J	0.23 J	< 5.0 U	< 5.0 U
1,2-Dichloroethane	0.6	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane	1	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
4-methyl-2-pentanone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Acetone	NE	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Benzene	1	< 0.7 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromoform	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon Disulfide	60	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Carbon tetrachloride	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane	50	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)	NE	190 D	140	110	100	82	68	42
Chloroethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Chloroform	7	0.28 J	0.25 J	0.36 J	0.37 J	0.39 J	0.41 J	0.37 J
Chloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-dichloroethene	5	0.24 J	0.29 J	< 5.0 U	0.22 J	0.20 J	0.24 J	< 5.0 U
cis-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Methyl N-Butyl Ketone	50	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U	< 50 U
Methyl tert-Butyl Ether	5	0.28 J	< 5.0 U	0.30 J	0.24 J	0.24 J	0.30 J	< 5.0 U
Styrene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene	5	0.95 J	1.3 J	1.1 J	1.1 J	0.79 J	0.82 J	0.74 J
Toluene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,2-dichloroethene	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-dichloropropene	0.4	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethylene	5	0.82 J	0.75 J	0.67 J	0.76 J	0.67 J	0.79 J	0.61 J
Trichlorofluoromethane (Freon 11)	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)	5	0.38 J	0.33 J	0.39 J	0.29 J	< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride	2	< 2 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U	< 2.0 U
Xylene-o	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Xylenes - m,p	5	< 5 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U	< 5.0 U
Total VOCs ⁽²⁾		194	144	113	104	85	71	44
Project VOCs ⁽³⁾		2.7	3.1	2.2	2.9	2.3	2.3	1.7

See notes on last page.

Table 9. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Notes:

- (1) Water samples collected by ARCADIS on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3 (prior to September 1, 2014) and per USEPA Method 8260C (after September 1, 2014). Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009). See previous quarterly reports for historical analytical results.
- (2) "Total VOCs" represents the sum of individual concentrations of the VOCs detected.
- (3) "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and xylenes-o,m, and p.
- (4) Samples were collected on October 1, 2014 due to system maintenance during the third quarter of 2014.

Acronyms\Key:

Indicates an exceedance of an SCG.

Bold value indicates a detection.

- ASP Analytical services protocol.
- ELAP Environmental Laboratory Approval Program
- NYSDEC New York State Department of Environmental Conservation.
- NYSDOH New York State Department of Health
- SCGs Standards, criteria, and guidance values.
- VOC Volatile organic compound.
- µg/L Micrograms per liter.
- Not analyzed.
- NE Not established.
- D Compound identified from secondary dilution.
- J Compound detected but below its reporting limit; the value is estimated.
- < 5; <5 U Compound not detected above its laboratory quantification limit.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

COMPOUND (µg/L)	Sample Location:	RW-1	RW-1	RW-1	RW-1 ⁽²⁾	RW-1	RW-1	RW-1	RW-1	RW-1	RW-1	RW-1 ⁽⁴⁾
	Sample Date:	2/10/2011	10/3/2011	11/11/2011	10/1/2012	1/7/2013	4/1/2013	7/1/2013	11/14/2013	2/18/2014	5/5/2014	10/1/2014
	NYSDEC <u>SCGs</u>											
Total Cadmium	5	--	--	< 5	< 5	--	--	--	< 5.0	--	--	--
Dissolved Cadmium	5	--	--	< 5	< 5	--	--	--	< 5.0	--	--	--
Total Chromium	50	--	--	23	23	--	--	--	28	--	--	--
Dissolved Chromium	50	--	--	24	23	--	--	--	32	--	--	--
Total Iron	300	< 100	< 100	--	< 100	--	--	--	< 100	--	--	--
Dissolved Iron	300	< 100	< 100	--	< 100	--	--	--	< 100	--	--	--
Total Manganese	300	--	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese	300	--	--	--	--	--	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	< 0.20	--	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

COMPOUND (µg/L)	Sample Location:	RW-2	RW-2	RW-2 ⁽³⁾	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2	RW-2 ⁽⁴⁾
	Sample Date:	1/7/2013	2/4/2013	3/4/2013	4/1/2013	5/6/2013	6/6/2013	7/1/2013	11/14/2013	2/18/2014	5/5/2014	10/1/2014
	NYSDEC SCGs											
Total Cadmium	5	--	--	--	--	--	--	--	< 5.0	--	--	--
Dissolved Cadmium	5	--	--	--	--	--	--	--	< 5.0	--	--	--
Total Chromium	50	--	--	--	--	--	--	--	< 10	--	--	--
Dissolved Chromium	50	--	--	--	--	--	--	--	< 10	--	--	--
Total Iron	300	600	640	1,950	1,070	700	990	1,200	1,540	890	660	2,060
Dissolved Iron	300	560	520	1,920	720	600	740	650	850	680	760	1,200
Total Manganese	300	--	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese	300	--	--	--	--	--	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	< 0.20	--	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

COMPOUND (µg/L)	Sample Location:	RW-3	RW-3	RW-3	RW-3	RW-3	RW-3	RW-3	RW-3	RW-3	RW-3	RW-3 ⁽⁴⁾
	Sample Date:	1/7/2013	2/4/2013	3/4/2013	4/1/2013	5/6/2013	6/6/2013	7/1/2013	11/14/2013	2/18/2014	5/5/2014	10/1/2014
	NYSDEC SCGs											
Total Cadmium	5	--	--	--	--	--	--	--	< 5.0	--	--	--
Dissolved Cadmium	5	--	--	--	--	--	--	--	< 5.0	--	--	--
Total Chromium	50	--	--	--	--	--	--	--	< 10	--	--	--
Dissolved Chromium	50	--	--	--	--	--	--	--	< 10	--	--	--
Total Iron	300	< 100	290	130	230	330	280	180	280	170	190	350
Dissolved Iron	300	< 100	110	130	110	< 100	140	<100	150	<100	<100	<100
Total Manganese	300	--	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese	300	--	--	--	--	--	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	< 0.20	--	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

COMPOUND (µg/L)	Sample Location:	RW-4	RW-4	RW-4	RW-4 ⁽²⁾	RW-4	RW-4	RW-4	RW-4	RW-4	RW-4	RW-4 ⁽⁴⁾
	Sample Date:	10/4/2010	10/3/2011	11/11/2011	10/1/2012	1/7/2013	4/1/2013	7/1/2013	11/14/2013	2/18/2014	5/5/2014	10/1/2014
	<u>NYSDEC SCGs</u>											
Total Cadmium	5	< 5	--	< 5	< 5	--	--	--	< 5.0	--	--	--
Dissolved Cadmium	5	< 5	--	< 5	< 5	--	--	--	< 5.0	--	--	--
Total Chromium	50	< 10	--	< 10	< 10	--	--	--	< 10	--	--	--
Dissolved Chromium	50	< 10	--	< 10	< 10	--	--	--	< 10	--	--	--
Total Iron	300	< 100	< 100	< 100	< 100	--	--	--	< 100	--	--	--
Dissolved Iron	300	< 100	< 100	< 100	< 100	--	--	--	< 100	--	--	--
Total Manganese	300	28	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese	300	29	--	--	--	--	--	--	--	--	--	--
Total Mercury	0.7	--	--	--	--	--	--	--	< 0.20	--	--	--
Dissolved Mercury	0.7	--	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 10. Concentrations of Metals in Groundwater Samples Collected from Remedial Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ⁽¹⁾

Notes:

- (1) Water samples collected by ARCADIS on the dates shown and submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory for metals analysis using USEPA Method 6010 and for mercury analyses using USEPA Method 7470. Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).
- (2) Beginning January 2012 metals analyses for recovery wells RW-1 and RW-4 are included with annual recovery well sampling performed in the fourth quarter of each year.
- (3) Elevated RW-2 iron concentrations are believed attributed to multiple system shutdowns and re-starts due to a fouled pressure switch on March 2 and March 3, 2013. Turbulence dislodged accumulated iron deposits at the remedial well piping.
- (4) Samples were collected on October 1, 2014 due to system maintenance during the third quarter of 2014.

Acronyms/Key:

- Indicates an exceedance of an SCG.
- 700** Bold data indicates that the analyte was detected at or above its reporting limit.
- ASP Analytical services protocol.
- ELAP Environmental Laboratory Approval Program
- NYSDCEC New York State Department of Environmental Conservation.
- NYSDOH New York State Department of Health
- USEPA U.S. Environmental Protection Agency
- SCGs Standards, criteria, and guidance values.
- µg/L Micrograms per liter.
- Not analyzed.
- < 5 Compound not detected above its laboratory quantification limit.

Table 11. Summary of Water-Level Elevations, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Well Identification	Well Casing Elevation (ft msl)	Event Date	Baseline (1) 5/8/2009 (ft msl)	1Q2010 02/04/10 (ft msl)	2Q2010 04/23/10 (ft msl)	3Q2010 08/26/10 (ft msl)	4Q2010 12/10/10 (ft msl)	1Q2011 02/04/11 (ft msl)	2Q2011 05/20/11 (ft msl)	3Q2011 08/09/11 (ft msl)	4Q2011 10/26/11 (ft msl)	1Q2012 01/25/12 (ft msl)	2Q2012 05/02/12 (ft msl)	3Q2012 08/17/12 (ft msl)	4Q2012 10/05/12 (ft msl)	1Q2013 02/13/13 (ft msl)	2Q2013 05/13/13 (ft msl)	3Q2013 08/13/13 (ft msl)	4Q2013 11/01/13 (ft msl)	1Q2014 03/07/14 (ft msl)	2Q2014 06/03/14 (ft msl)	3Q2014 08/15/14 (ft msl)
Recovery Wells																						
RW-1	125.18		69.75	70.67	74.38	72.52	71.11	70.96	72.13	70.44	72.72	73.15	72.12	71.71	71.21	70.35	70.89	71.62	69.31	68.08	69.97	69.83
RW-2	124.48		72.27	61.80	64.88	63.44	61.35	67.99	66.31	64.18	65.11	69.05	69.81	65.3	63.7	62.66	63.33	61.35	60.23	58.2	64.45	64.22
RW-3	122.84		69.40	67.64	71.4	69.44*	68.13	67.74	68.88	67.64	69.70	70.75	71.74	74.35 ⁽²⁾	68.06	68.01	68.73	72.29	67.11	64.49	66.97	67.09
RW-4	121.25		69.25	70.35	74.02	71.93	70.56	67.06	71.37	69.95	72.13	72.71	71.61	70.88	70.67	69.7	70.37	71.2	68.7	67.38	69.40	68.81
Monitoring Wells																						
B24MW-2	126.96		74.31	74.13	76.16	75.86	75.65	74.96	76.06	74.35	76.00	76.28	75.57	75.76	74.63	74.85	74.32	73.81	72.88	72.65	73.48	73.93
B24MW-3	127.11		72.63	72.16	75.87	74.10	72.89	72.40	74.04	72.27	74.44	74.63	73.67	73.62	72.69	72.2	72.41	73.14	68.24	69.82	71.67	71.77
B30MW-1	128.33		73.55	73.00	76.54	74.96	73.86	73.38	74.75	73.25	75.41	75.54	74.66	NM	73.66	73.11	73.28	73.97	72.26	70.73	72.61	72.21
BCPMW-1	125.73		73.16	72.67	76.26	74.66	73.43	72.94	74.75	72.94	75.05	75.23	74.29	74.22	73.27	NM	73.09	73.51	71.66	70.27	72.86	72.40
BCPMW-2	126.39		72.55	71.83	75.52	73.69	72.55	72.03	73.64	71.94	74.16	74.33	73.29	73.17	72.39	71.82	72.09	72.66	70.77	69.51	71.41	71.19
BCPMW-3	124.94		72.46	71.59	75.24	73.40	72.27	71.74	73.25	71.64	73.94	74.05	73.06	72.85	72.14	71.56	71.79	72.44	70.57	69.25	71.12	70.78
BCPMW-4-1	128.76		72.30	71.33	75.05	73.13	72.02	71.56	73.08	71.46	73.70	73.78	72.81	72.59	71.89	71.41	71.56	72.32	70.3	69.01	70.96	70.55
BCPMW-4-2	129.15		72.58	71.36	75.07	73.16	72.08	71.56	73.06	71.51	73.74	73.83	72.83	72.61	71.92	71.42	71.58	72.31	70.32	69.03	70.98	70.60
BCPMW-4-3	129.19		72.32	71.46	75.16	73.26	72.14	71.73	73.19	71.55	73.84	73.96	72.94	72.71	71.97	71.53	71.67	72.43	70.4	69.16	71.06	70.74
BCPMW-5-1	129.37		72.79	72.14	75.66	73.94	72.72	72.74	73.81	72.14	74.46	74.77	73.67	73.34	72.62	72.06	72.19	72.87	71.01	69.78	71.56	71.22
BCPMW-6-1	126.01		72.12	71.26	74.91	72.96	71.91	71.49	72.77	71.45	73.58	73.67	72.66	72.32	71.73	71.12	71.32	72.15	70.15	68.79	70.85	70.21
BCPMW-6-2	125.16		71.74	70.96	74.64	72.60	71.59	71.17	72.49	71.01	73.26	73.37	72.30	71.97	71.39	70.84	71.01	71.84	69.83	68.49	70.48	69.94
BCPMW-7-1	124.81		72.00	71.33	74.99	72.99	71.97	71.51	72.78	71.53	73.62	73.71	72.71	72.31	71.77	71.2	71.33	72.26	70.21	68.82	70.86	70.19
MW-200-1	123.49		72.16	71.37	75.07	73.14	72.08	71.72	72.98	71.52	73.69	73.83	72.76	72.59	71.91	71.34	71.53	72.31	70.37	69.06	71.03	70.55
MW-201-1	121.69		72.04	71.10	74.84	72.87	71.79	71.33	72.69	71.25	73.48	73.55	72.53	72.28	71.65	71.09	71.28	72.05	70.08	68.75	70.75	70.07
MW-202-1	119.27		71.90	71.13	74.83	72.82	71.77	71.32	72.66	71.21	73.46	73.57	73.51	72.23	71.6	70.98	71.23	--	70.06	68.75	70.70	70.13
MW-203-1	118.25		71.83	71.10	74.75	72.77	71.75	71.30	72.61	70.20	73.43	73.52	72.49	72.13	71.56	71.02	71.17	72.01	70.01	68.7	70.64	70.03
Piezometers																						
PZ-1a	128.82		72.56	71.15	74.87	72.94	71.85	71.33	72.76	71.31	73.54	73.62	72.63	72.42	71.72	71.23	71.39	NM ⁽³⁾				
PZ-1b	128.92		72.47	71.09	74.78	72.88	71.82	71.28	72.70	71.24	73.47	73.55	72.56	72.36	71.64	71.16	71.35	72.06	70.34	68.77	70.69	70.27
PZ-1c	128.96		72.47	71.48	75.15	73.23	72.13	71.74	73.16	71.56	73.83	73.9	72.90	72.68	71.94	71.46	71.63	72.39	70.39	69.12	71.01	70.67
PZ-2a	128.36		72.47	71.09	74.82	72.87	71.81	71.34	72.74	71.30	73.45	73.57	72.57	72.32	71.64	71.14	71.32	72.06	70.08	68.73	70.74	70.23
PZ-2b	128.37		72.43	71.08	74.77	72.86	71.78	71.30	72.68	71.27	73.45	73.55	72.54	72.28	71.61	71.13	71.29	72.05	70.08	68.71	70.74	70.23
PZ-2c	128.55		72.41	71.40	75.05	73.15	72.05	71.68	73.05	71.52	73.74	73.87	72.82	72.55	71.88	71.38	71.55	72.34	70.33	69.02	70.93	70.58
PZ-3	124.99		72.52	70.94	74.69	72.71	71.65	70.93	72.55	71.08	73.28	73.4	72.35	72.16	71.44	71.06	71.18	71.92	69.95	68.61	70.60	70.07
PZ-4	125.31		72.50	71.07	74.81	72.83	71.78	71.45	72.64	71.32	73.42	73.52	72.54	72.32	71.63	71.18	71.33	72.05	70.09	68.76	70.70	70.25
PZ-5a	129.07		72.50	71.94	75.61	73.79	72.59	72.17	73.70	71.98	74.27	74.39	73.40	73.25	72.45	71.94	72.16	72.84	70.85	69.62	71.47	71.34
PZ-5b	129.06		72.50	71.84	75.53	73.69	72.51	72.08	73.67	71.88	74.16	74.29	73.29	73.15	72.35	71.85	72.08	72.73	70.72	69.51	71.35	71.31
PZ-6a	125.67		72.50	71.03	74.73	72.84	71.70	71.24	72.56	71.24	73.37	73.46	72.43	72.13	71.5	70.95	71.17	71.91	69.94	68.53	70.63	69.99
PZ-6b	125.74		72.50	70.93	74.7	72.65	71.58	71.11	72.46	71.14	73.28	73.37	72.34	72.05	71.43	70.88	71.11	71.81	69.86	68.44	70.52	69.93
PZ-7a	125.10		72.50	71.32	75.02	73.00	72.00	71.54	72.80	71.58	73.67	73.7	72.72	72.36	71.78	71.2	71.35	72.26	70.26	68.84	70.90	70.19
PZ-7b	125.06		72.50	71.21	74.85	72.83	71.83	71.37	72.68	71.26	73.45	73.53	72.51	72.13	71.54	71.05	71.16	71.54	70.07	68.68	70.64	70.06

Notes:

(1) Baseline readings were taken prior to system startup, which occurred on July 21, 2009.

(2) Measurement collected is believed to be anomalous.

(3) Well casing is broken and blockage exists at around 2 feet below top of casing.

*: RW-3 water level measurement collected on September 9, 2010.

Acronyms/Key:

ft msl feet relative to mean sea level

NM not measured

Table 12. Summary of Calculated Vertical Groundwater Hydraulic Gradients, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Observation Well Pairing			10/5/2012			2/13/2013			5/13/2013		
Shallow	Deep	Vertical Distance Between Screens (ft)	Observed Head		Vertical Hydraulic Gradient ⁽¹⁾ (ft/ft)	Observed Head		Vertical Hydraulic Gradient ⁽¹⁾ (ft/ft)	Observed Head		Vertical Hydraulic Gradient ⁽¹⁾ (ft/ft)
			Shallow (ft msl)	Deep (ft msl)		Shallow (ft msl)	Deep (ft msl)		Shallow (ft msl)	Deep (ft msl)	
PZ-1A	PZ-1B	20	71.72	71.64	-0.004	71.23	71.16	-0.0035	71.39	71.35	-0.002
PZ-1B	PZ-1C	50	71.64	71.94	0.006	71.16	71.46	0.006	71.35	71.63	0.0056
PZ-2A	PZ-2B	20	71.64	71.61	-0.0015	71.14	71.13	-0.0005	71.32	71.29	-0.0015
PZ-2B	PZ-2C	50	71.61	71.88	0.0054	71.13	71.38	0.005	71.29	71.55	0.0052
PZ-5A	PZ-5B	45	72.45	72.35	-0.0022	71.94	71.85	-0.002	72.16	72.08	-0.0018
PZ-6A	PZ-6B	25	71.50	71.43	-0.0028	70.95	70.88	-0.0028	71.17	71.11	-0.0024
PZ-7A	PZ-7B	48	71.78	71.54	-0.005	71.20	71.05	-0.0031	71.35	71.16	-0.004
BCPMW-4-1	BCPMW-4-2	21	71.89	71.92	0.0014	71.41	71.42	0.0005	71.56	71.58	0.001
BCPMW-4-2	BCPMW-4-3	44	71.92	71.97	0.0011	71.42	71.53	0.0025	71.58	71.67	0.002
BCPMW-6-1	BCPMW-6-2	44.5	71.73	71.39	-0.0072	71.12	70.84	-0.0076	71.32	71.01	-0.007

Notes:

(1) Positive groundwater hydraulic gradient indicates a vertically upward gradient and a negative groundwater hydraulic gradient indicates vertically downward gradient.

(2) Well casing is broken and blockage exists at around 2ft below top of casing.

Acronyms/Key:

ft msl feet relative to mean sea level
 ft/ft feet per foot
 NM not measured
 -- not applicable

Table 12. Summary of Calculated Vertical Groundwater Hydraulic Gradients, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Observation Well Pairing			8/13/2013			11/1/2013			3/7/2014		
Shallow	Deep	Vertical Distance Between Screens (ft)	Observed Head		Vertical Hydraulic Gradient ⁽¹⁾ (ft/ft)	Observed Head		Vertical Hydraulic Gradient ⁽¹⁾ (ft/ft)	Observed Head		Vertical Hydraulic Gradient ⁽¹⁾ (ft/ft)
			Shallow (ft msl)	Deep (ft msl)		Shallow (ft msl)	Deep (ft msl)		Shallow (ft msl)	Deep (ft msl)	
PZ-1A	PZ-1B	20	NM ⁽²⁾	72.06	--	NM ⁽²⁾	70.34	--	NM ⁽²⁾	68.77	--
PZ-1B	PZ-1C	50	72.06	72.39	0.0066	70.34	70.39	0.001	68.77	69.12	0.007
PZ-2A	PZ-2B	20	72.06	72.05	-0.0005	70.08	70.08	0	68.73	68.71	-0.001
PZ-2B	PZ-2C	50	72.05	72.34	0.0058	70.08	70.33	0.005	68.71	69.02	0.0062
PZ-5A	PZ-5B	45	72.84	72.73	-0.0024	70.85	70.72	-0.0029	69.62	69.51	-0.0024
PZ-6A	PZ-6B	25	71.91	71.81	-0.004	69.94	69.86	-0.0032	68.53	68.44	-0.0036
PZ-7A	PZ-7B	48	72.26	71.54	-0.015	70.26	70.07	-0.004	68.84	68.68	-0.0033
BCPMW-4-1	BCPMW-4-2	21	72.32	72.31	-0.0005	70.30	70.32	0.001	69.01	69.03	0.001
BCPMW-4-2	BCPMW-4-3	44	72.31	72.43	0.0027	70.32	70.40	0.0018	69.03	69.16	0.003
BCPMW-6-1	BCPMW-6-2	44.5	72.15	71.84	-0.007	70.15	69.83	-0.0072	68.79	68.49	-0.0067

Notes:

(1) Positive groundwater hydraulic gradient indicates a vertically upward gradient and a negative groundwater hydraulic gradient indicates vertically downward gradient.

(2) Well casing is broken and blockage exists at around 2ft below top of casing.

Acronyms/Key:

ft msl feet relative to mean sea level
 ft/ft feet per foot
 NM not measured
 -- not applicable

Table 12. Summary of Calculated Vertical Groundwater Hydraulic Gradients, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Observation Well Pairing		Vertical Distance Between Screens (ft)	6/3/2014			8/15/2014		
Shallow	Deep		Observed Head		Vertical Hydraulic Gradient ⁽¹⁾ (ft/ft)	Observed Head		Vertical Hydraulic Gradient ⁽¹⁾ (ft/ft)
			Shallow (ft msl)	Deep (ft msl)		Shallow (ft msl)	Deep (ft msl)	
PZ-1A	PZ-1B	20	NM ⁽²⁾	70.69	--	NM ⁽²⁾	70.27	--
PZ-1B	PZ-1C	50	70.69	71.01	0.0064	70.27	70.67	0.008
PZ-2A	PZ-2B	20	70.74	70.74	0	70.23	70.23	0
PZ-2B	PZ-2C	50	70.74	70.93	0.0038	70.23	70.58	0.007
PZ-5A	PZ-5B	45	71.47	71.35	-0.0027	71.34	71.31	-0.0007
PZ-6A	PZ-6B	25	70.63	70.52	-0.0044	69.99	69.93	-0.0024
PZ-7A	PZ-7B	48	70.90	70.64	-0.0054	70.19	70.06	-0.0027
BCPMW-4-1	BCPMW-4-2	21	70.96	70.98	0.001	70.55	70.60	0.0024
BCPMW-4-2	BCPMW-4-3	44	70.98	71.06	0.0018	70.60	70.74	0.0032
BCPMW-6-1	BCPMW-6-2	44.5	70.85	70.48	-0.0083	70.21	69.94	-0.0061

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Notes:

(1) Positive groundwater hydraulic gradient indicates a vertically upward gradient and a negative groundwater hydraulic gradient indicates vertically downward gradient.

(2) Well casing is broken and blockage exists at around 2ft below top of casing.

Acronyms/Key:

ft msl feet relative to mean sea level
 ft/ft feet per foot
 NM not measured
 -- not applicable

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	B24MW-2	B24MW-2	B24MW-2	B24MW-2	B24MW-2
	Sample Date:	4/23/2009	10/4/2010	10/27/2011	10/3/2012	6/13/2013
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 5.0 J
1,1,1,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5.0 J
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5.0 J
1,1-Dichloroethane	5	< 5	< 5	< 5	< 5	< 5.0 J
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5.0 J
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5.0 J
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5.0 J
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50 J
4-Methyl-2-Pentanone	50	< 50	< 50	< 50	< 50	< 50 J
Acetone	NE	< 50 B	< 50	< 50 B	< 50	< 50 J
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.70 J
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5.0 J
Bromoform	50	< 5	< 5	< 5	< 5	< 5.0 J
Bromomethane	5	< 5	< 5	< 5	< 5	< 5.0 J
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5.0 J
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5.0 J
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5.0 J
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5.0 J
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	0.41 J	< 5.0 J
Chloroethane	5	< 5	< 5	< 5	< 5	< 5.0 J
Chloroform	7	< 5	0.3 J	< 5	1.3 J	0.21 J
Chloromethane	5	< 5	< 5	< 5	< 5	< 5.0 J
cis-1,2-Dichloroethene	5	< 5	< 5	< 5	1.9 J	0.23 J
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5.0 J
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5.0 J
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5.0 J
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5.0 J
Methyl N-Butyl Ketone	50	< 50	< 50	< 50	< 50	< 50 J
Methyl-Tert-Butylether	5	--	< 5	--	0.45 J	0.21 J
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5.0 J
Tetrachloroethene	5	< 5	< 5	< 5	< 5	< 5.0 J
Toluene	5	< 5	< 5	< 5	< 5	< 5.0 J
trans-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5.0 J
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5.0 J
Trichloroethene	5	3.7 J	4.4 J	3.2 J	25	4.3 J
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5.0 J
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2.0 J
Xylene - o	5	< 5	< 5	< 5	< 5	< 5.0 J
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5.0 J
Total VOCs ⁽³⁾		3.7	4.7	3.2	29	5.0
Project VOCs ⁽⁴⁾		3.7	4.4	3.2	27	4.5

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	B24MW-3	B24MW-3	B24MW-3	B24MW-3	B24MW-3
	Sample Date:	4/20/2009	10/6/2010	10/27/2011	10/4/2012	6/13/2013
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	0.62 J	< 5	< 5	< 5	< 5.0 J
1,1,1,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5.0 J
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5.0 J
1,1-Dichloroethane	5	< 5	< 5	< 5	< 5	< 5.0 J
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5.0 J
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5.0 J
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5.0 J
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50 J
4-Methyl-2-Pentanone	50	< 50 J	< 50	< 50	< 50	< 50 J
Acetone	NE	< 50	< 50	< 50	< 50	< 50 J
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.70 J
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5.0 J
Bromoform	50	< 5	< 5	< 5	< 5	< 5.0 J
Bromomethane	5	< 5	< 5	< 5	< 5	< 5.0 J
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5.0 J
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5.0 J
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5.0 J
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5.0 J
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	< 5.0 J
Chloroethane	5	< 5	< 5	< 5	< 5	< 5.0 J
Chloroform	7	< 5	< 5	0.32 J	0.38 J	1.3 J
Chloromethane	5	< 5	< 5	< 5	< 5	< 5.0 J
cis-1,2-Dichloroethene	5	10	1.2 J	0.4 J	0.62 J	< 5.0 J
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5.0 J
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5.0 J
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5.0 J
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5.0 J
Methyl N-Butyl Ketone	50	< 50 J	< 50	< 50	< 50	< 50 J
Methyl-Tert-Butylether	5	--	< 5	--	< 5	< 5.0 J
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5.0 J
Tetrachloroethene	5	0.51 J	< 5	< 5	< 5	< 5.0 J
Toluene	5	< 5	< 5	< 5	< 5	< 5.0 J
trans-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5.0 J
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5.0 J
Trichloroethene	5	45	5.9	1.4 J	1 J	0.44 J
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5.0 J
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2.0 J
Xylene - o	5	< 5	< 5	< 5	< 5	< 5.0 J
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5.0 J
Total VOCs ⁽³⁾		56	7.1	2.1	2.0	1.7
Project VOCs ⁽⁴⁾		56	7.1	1.8	1.6	0.4

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	B30MW-1	B30MW-1	B30MW-1	B30MW-1	B30MW-1
	Sample Date:	4/23/2009	10/4/2010	10/27/2011	10/3/2012	6/14/2013
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 5.0
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5.0
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5.0
1,1-Dichloroethane	5	< 5	< 5	< 5	< 5	< 5.0
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5.0
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5.0
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5.0
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone	50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	< 50 B	< 50 B	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.70
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5.0
Bromoform	50	< 5	< 5	< 5	< 5	< 5.0
Bromomethane	5	< 5	< 5	< 5	< 5	< 5.0
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5.0
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5.0
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5.0
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5.0
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	< 5.0
Chloroethane	5	< 5	< 5	< 5	< 5	< 5.0
Chloroform	7	< 5	< 5	< 5	< 5	< 5.0
Chloromethane	5	< 5	< 5	< 5	< 5	< 5.0
cis-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5.0
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5.0
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5.0
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5.0
Methyl N-Butyl Ketone	50	< 50	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether	5	--	< 5	--	< 5	< 5.0
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5.0
Tetrachloroethene	5	< 5	< 5	< 5	< 5	< 5.0
Toluene	5	< 5	< 5	< 5	< 5	< 5.0
trans-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5.0
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5.0
Trichloroethene	5	< 5	< 5	< 5	< 5	< 5.0
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5.0
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2.0
Xylene - o	5	< 5	< 5	< 5	< 5	< 5.0
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5.0
Total VOCs ⁽³⁾		0	0	0	0	0
Project VOCs ⁽⁴⁾		0	0	0	0	0

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

	Sample Location:	BCPMW-1	BCPMW-2	BCPMW-3
Constituent in µg/L	Sample Date:	4/28/2009	4/28/2009	4/29/2009
NYSDEC				
<u>SCGs</u>				
1,1,1-Trichloroethane	5	< 5	< 10	< 25
1,1,2,2-Tetrachloroethane	5	< 5	< 10	< 25
1,1,2-Trichloroethane	1	< 5	< 10	< 25
1,1-Dichloroethane	5	0.37 J	8 J	9.6 J
1,1-Dichloroethene	5	< 5	3.8 J	43
1,2-Dichloroethane	0.6	< 5	0.68 J	< 25
1,2-Dichloropropane	1	< 5	< 10	< 25
2-Butanone	NE	< 50	< 100	< 250
4-Methyl-2-Pentanone	50	< 50	< 100	< 250
Acetone	NE	< 50 B	< 100	< 250
Benzene	1	< 0.7	< 1.4	< 3.5
Bromodichloromethane	50	< 5	< 10	< 25
Bromoform	50	< 5	< 10	< 25
Bromomethane	5	< 5	< 10	< 25
Carbon Disulfide	60	< 5	< 10	< 25
Carbon Tetrachloride	5	< 5	< 10	< 25
Chlorobenzene	5	< 5	< 10	< 25
Chlorodibromomethane	50	< 5	< 10	< 25
Chlorodifluoromethane (Freon 22)	NE	< 5	< 10	< 25
Chloroethane	5	< 5	< 10	< 25
Chloroform	7	0.88 J	< 10	< 25
Chloromethane	5	< 5	< 10	< 25
cis-1,2-Dichloroethene	5	22	310	900
cis-1,3-Dichloropropene	0.4	< 5	< 10	< 25
Dichlorodifluoromethane (Freon 12)	5	< 5	< 10	< 25
Dichloromethane	5	0.52 J	< 10	< 25
Ethylbenzene	5	< 5	< 10	< 25 B
Methyl N-Butyl Ketone	50	< 50	< 100	< 250
Methyl-Tert-Butylether	5	--	--	--
Styrene (Monomer)	5	< 5	< 10	< 25
Tetrachloroethene	5	< 5	1.5 J	< 25
Toluene	5	0.33 J	< 10	< 25 B
trans-1,2-Dichloroethene	5	0.44 J	2.4 J	8.9 J
trans-1,3-Dichloropropene	0.4	< 5	< 10	< 25
Trichloroethene	5	190	180	470
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 10	< 25
Vinyl Chloride	2	< 2	4.1	300
Xylene - o	5	< 5	< 10	< 25 B
Xylenes - m,p	5	< 5	< 10	< 25 B
Total VOCs ⁽³⁾		220	510	1,700
Project VOCs ⁽⁴⁾		210	510	1,700

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	BCPMW-4-1	BCPMW-4-1	BCPMW-4-1	BCPMW-4-1	BCPMW-4-1
	Sample Date:	4/17/2009	12/1/2009	10/4/2010	10/28/2011	10/3/2012
NYSDEC						
SCGs						
1,1,1-Trichloroethane	5	< 25	2.4 J	14 J	10 J	29
1,1,2,2-Tetrachloroethane	5	< 25	< 5	< 25	< 25	< 25
1,1,2-Trichloroethane	1	< 25	0.38 J	< 25	< 25	1.7 J
1,1-Dichloroethane	5	6.5 J	46	38	18 J	39
1,1-Dichloroethene	5	1.8 J	14	21 J	13 J	24 J
1,2-Dichloroethane	0.6	< 25	0.65 J	< 25	2.1 J	4.8 J
1,2-Dichloropropane	1	< 25	4.7 J	3.8 J	1.9 J	5.1 J
2-Butanone	NE	< 250	< 50	< 250	< 250	< 250
4-Methyl-2-Pentanone	50	< 250 J	< 50	< 250	< 250	< 250
Acetone	NE	< 250 J	< 50	< 250	< 250B	< 250
Benzene	1	< 3.5	0.44 J	< 3.5	< 3.5	< 3.5
Bromodichloromethane	50	< 25	< 5	< 25	< 25	< 25
Bromoform	50	< 25	< 5	< 25	< 25	< 25
Bromomethane	5	< 25	R	< 25	< 25	< 25
Carbon Disulfide	60	< 25	< 5	< 25	< 25	< 25
Carbon Tetrachloride	5	< 25	< 5	< 25	< 25	< 25
Chlorobenzene	5	< 25	< 5	< 25	< 25	< 25
Chlorodibromomethane	50	< 25	< 5	< 25	< 25	< 25
Chlorodifluoromethane (Freon 22)	NE	17 J	6.2	4.3 J	2.5 J	< 25
Chloroethane	5	< 25	2.4 J	4.1 J	< 25	1.6 J
Chloroform	7	< 25	< 5	< 25	< 25	< 25
Chloromethane	5	< 25	R	< 25	< 25	< 25
cis-1,2-Dichloroethene	5	1800 D	750 D	510	500	840
cis-1,3-Dichloropropene	0.4	< 25	< 5	< 25	< 25	< 25
Dichlorodifluoromethane (Freon 12)	5	< 25	< 5	< 25	< 25	< 25
Dichloromethane	5	< 25	< 5	< 25	< 25 B	< 25
Ethylbenzene	5	< 25	< 5	< 25	< 25	< 25
Methyl N-Butyl Ketone	50	< 250 J	< 50	< 250	< 250	< 250
Methyl-Tert-Butylether	5	--	--	< 25	< 25	< 25
Styrene (Monomer)	5	< 25	< 5	< 25	< 25	< 25
Tetrachloroethene	5	< 25	0.64 J	< 25	< 25	< 25
Toluene	5	< 25	< 5	< 25	< 25	< 25
trans-1,2-Dichloroethene	5	110	2.5 J	3.9 J	1.3 J	2.2 J
trans-1,3-Dichloropropene	0.4	< 25	< 5	< 25	< 25	< 25
Trichloroethene	5	22 J	170	45	43	110
Trichlorotrifluoroethane (Freon 113)	5	< 25	< 5	< 25	< 25	< 25
Vinyl Chloride	2	180	540 D	220	32	420
Xylene - o	5	< 25	8	< 25	< 25	< 25
Xylenes - m,p	5	< 25	< 5	< 25	< 25	< 25
Total VOCs ⁽³⁾		2,100	1,500	860	620	1,500
Project VOCs ⁽⁴⁾		2,100	1,500	850	620	1,500

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Sample Location: <i>BCPMW-4-1</i>		
Constituent in µg/L	Sample Date: <i>6/5/2013</i>	
NYSDEC		
<u>SCGs</u>		
1,1,1-Trichloroethane	5	5.1
1,1,2,2-Tetrachloroethane	5	< 5.0
1,1,2-Trichloroethane	1	0.24 J
1,1-Dichloroethane	5	7.4
1,1-Dichloroethene	5	4.1 J
1,2-Dichloroethane	0.6	0.95 J
1,2-Dichloropropane	1	0.95 J
2-Butanone	NE	< 50
4-Methyl-2-Pentanone	50	< 50
Acetone	NE	< 50
Benzene	1	< 0.70
Bromodichloromethane	50	< 5.0
Bromoform	50	< 5.0
Bromomethane	5	< 5.0
Carbon Disulfide	60	< 5.0
Carbon Tetrachloride	5	< 5.0
Chlorobenzene	5	< 5.0
Chlorodibromomethane	50	< 5.0
Chlorodifluoromethane (Freon 22)	NE	1.1 J
Chloroethane	5	0.46 J
Chloroform	7	< 5.0
Chloromethane	5	< 5.0
cis-1,2-Dichloroethene	5	310 D
cis-1,3-Dichloropropene	0.4	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5.0
Dichloromethane	5	< 5.0
Ethylbenzene	5	< 5.0
Methyl N-Butyl Ketone	50	< 50
Methyl-Tert-Butylether	5	< 5.0
Styrene (Monomer)	5	< 5.0
Tetrachloroethene	5	0.37 J
Toluene	5	< 5.0
trans-1,2-Dichloroethene	5	0.78 J
trans-1,3-Dichloropropene	0.4	< 5.0
Trichloroethene	5	16
Trichlorotrifluoroethane (Freon 113)	5	< 5.0
Vinyl Chloride	2	47
Xylene - o	5	< 5.0
Xylenes - m,p	5	< 5.0
Total VOCs ⁽³⁾		390
Project VOCs ⁽⁴⁾		390

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	BCPMW-4-2	BCPMW-4-2	BCPMW-4-2	BCPMW-4-2	BCPMW-4-2
	Sample Date:	4/17/2009	12/4/2009	10/7/2010	10/28/2011	10/3/2012
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	< 250	< 10	< 5	0.33 J	0.23 J
1,1,2,2-Tetrachloroethane	5	< 250	< 10	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 250	< 10	< 5	< 5	< 5
1,1-Dichloroethane	5	57 J	8.7 J	7.3	2.6 J	1.4 J
1,1-Dichloroethene	5	34 J	2.7 J	1.9 J	1.1 J	0.8 J
1,2-Dichloroethane	0.6	< 250	< 10	0.91 J	0.85 J	0.45 J
1,2-Dichloropropane	1	< 250	< 10	0.9 J	0.39 J	< 5
2-Butanone	NE	< 2500	< 100	< 50	< 50	< 50
4-Methyl-2-Pentanone	50	< 2500 J	< 100	< 50	< 50	< 50
Acetone	NE	< 2500 J	< 100	< 50 B	< 50	< 50
Benzene	1	< 35	< 1.4	< 0.7	< 0.7 U	< 0.7
Bromodichloromethane	50	< 250	< 10	< 5	< 5	< 5
Bromoform	50	< 250	< 10	< 5	< 5	< 5
Bromomethane	5	< 250	< 10	< 5	< 5	< 5
Carbon Disulfide	60	< 250	< 10	< 5	< 5	< 5
Carbon Tetrachloride	5	< 250	< 10	< 5	< 5	< 5
Chlorobenzene	5	< 250	< 10	< 5	< 5	< 5
Chlorodibromomethane	50	< 250	< 10	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 250	0.8 J	< 5	< 5	< 5
Chloroethane	5	< 250	1.1 J	0.79 J	< 5	< 5
Chloroform	7	< 250	< 10	0.96 J	0.62 J	0.54 J
Chloromethane	5	< 250	R	< 5	< 5	< 5
cis-1,2-Dichloroethene	5	18000 D	270	99	59	70
cis-1,3-Dichloropropene	0.4	< 250	< 10	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 250	< 10	< 5	< 5	< 5
Dichloromethane	5	< 250	< 10	< 5	< 5	< 5
Ethylbenzene	5	62 J	0.78 J	< 5	< 5	< 5
Methyl N-Butyl Ketone	50	< 2500 J	< 100	< 50	< 50	< 50
Methyl-Tert-Butylether	5	--	--	0.35 J	0.28 J	0.29 J
Styrene (Monomer)	5	< 250	< 10	< 5	< 5	< 5
Tetrachloroethene	5	< 250	0.82 J	0.73 J	0.59 J	0.91 J
Toluene	5	2400	< 10 B	< 5	< 5	< 5
trans-1,2-Dichloroethene	5	< 250	1.3 J	0.65 J	0.41 J	0.5 J
trans-1,3-Dichloropropene	0.4	< 250	< 10	< 5	< 5	< 5
Trichloroethene	5	< 250	310	66	50	68
Trichlorotrifluoroethane (Freon 113)	5	< 250	< 10	< 5	< 5	< 5
Vinyl Chloride	2	6300	58	54	20	9.5
Xylene - o	5	110 J	< 10 B	< 5	< 5	< 5
Xylenes - m,p	5	190 J	< 10 B	< 5	< 5	< 5
Total VOCs ⁽³⁾		27,000	660	230	140	150
Project VOCs ⁽⁴⁾		27,000	650	230	130	150

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Sample Location: <i>BCPMW-4-2</i>		
Constituent in µg/L	Sample Date:	<i>6/5/2013</i>
NYSDEC		
<u>SCGs</u>		
1,1,1-Trichloroethane	5	0.22 J
1,1,1,2-Tetrachloroethane	5	< 5.0
1,1,2-Trichloroethane	1	< 5.0
1,1-Dichloroethane	5	1.5 J
1,1-Dichloroethene	5	0.49 J
1,2-Dichloroethane	0.6	0.52 J
1,2-Dichloropropane	1	< 5.0
2-Butanone	NE	< 50
4-Methyl-2-Pentanone	50	< 50
Acetone	NE	1.8 J
Benzene	1	< 0.70
Bromodichloromethane	50	< 5.0
Bromoform	50	< 5.0
Bromomethane	5	< 5.0
Carbon Disulfide	60	< 5.0
Carbon Tetrachloride	5	< 5.0
Chlorobenzene	5	< 5.0
Chlorodibromomethane	50	< 5.0
Chlorodifluoromethane (Freon 22)	NE	< 5.0
Chloroethane	5	< 5.0
Chloroform	7	3.3 J
Chloromethane	5	< 5.0
cis-1,2-Dichloroethene	5	47
cis-1,3-Dichloropropene	0.4	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5.0
Dichloromethane	5	< 5.0
Ethylbenzene	5	< 5.0
Methyl N-Butyl Ketone	50	< 50
Methyl-Tert-Butylether	5	0.26 J
Styrene (Monomer)	5	< 5.0
Tetrachloroethene	5	0.63 J
Toluene	5	< 5.0
trans-1,2-Dichloroethene	5	0.40 J
trans-1,3-Dichloropropene	0.4	< 5.0
Trichloroethene	5	56
Trichlorotrifluoroethane (Freon 113)	5	< 5.0
Vinyl Chloride	2	9.7
Xylene - o	5	< 5.0
Xylenes - m,p	5	< 5.0
Total VOCs ⁽³⁾		120
Project VOCs ⁽⁴⁾		120

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	BCPMW-4-3	BCPMW-4-3	BCPMW-4-3	BCPMW-4-3	BCPMW-4-3
	Sample Date:	4/17/2009	12/1/2009	10/7/2010	10/28/2011	10/3/2012
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,1,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone	50	< 50 J	< 50	< 50	< 50	< 50
Acetone	NE	< 50 J	< 50	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	< 5
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	0.53 J	0.32 J	< 5	< 5	0.2 J
Chloromethane	5	< 5	R	< 5	< 5	< 5
cis-1,2-Dichloroethene	5	0.37 J	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone	50	< 50 J	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether	5	--	--	< 5	< 5	< 5
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	< 5	0.27 J	0.3 J
Toluene	5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	0.56 J	0.51 J	0.41 J	0.74 J	0.84 J
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	0.38 J	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2
Xylene - o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs ⁽³⁾		1.5	0.83	0.41	1.4	1.3
Project VOCs ⁽⁴⁾		0.93	0.51	0.41	1.0	1.1

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	<i>BCPMW-4-3 (REP)</i>	<i>BCPMW-4-3</i>
	Sample Date:	<i>6/5/2013</i>	<i>6/5/2013</i>
NYSDEC			
<u>SCGs</u>			
1,1,1-Trichloroethane	5	< 5.0	< 5.0
1,1,2,2-Tetrachloroethane	5	< 5.0	< 5.0
1,1,2-Trichloroethane	1	< 5.0	< 5.0
1,1-Dichloroethane	5	< 5.0	< 5.0
1,1-Dichloroethene	5	< 5.0	< 5.0
1,2-Dichloroethane	0.6	< 5.0	< 5.0
1,2-Dichloropropane	1	< 5.0	< 5.0
2-Butanone	NE	< 50	< 50
4-Methyl-2-Pentanone	50	< 50	< 50
Acetone	NE	< 50	< 50
Benzene	1	< 0.70	< 0.70
Bromodichloromethane	50	< 5.0	< 5.0
Bromoform	50	< 5.0	< 5.0
Bromomethane	5	< 5.0	< 5.0
Carbon Disulfide	60	< 5.0	< 5.0
Carbon Tetrachloride	5	< 5.0	< 5.0
Chlorobenzene	5	< 5.0	< 5.0
Chlorodibromomethane	50	< 5.0	< 5.0
Chlorodifluoromethane (Freon 22)	NE	< 5.0	< 5.0
Chloroethane	5	< 5.0	< 5.0
Chloroform	7	0.97 J	1.1 J
Chloromethane	5	< 5.0	< 5.0
cis-1,2-Dichloroethene	5	< 5.0	< 5.0
cis-1,3-Dichloropropene	0.4	< 5.0	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5.0	< 5.0
Dichloromethane	5	< 5.0	< 5.0
Ethylbenzene	5	< 5.0	< 5.0
Methyl N-Butyl Ketone	50	< 50	< 50
Methyl-Tert-Butylether	5	< 5.0	< 5.0
Styrene (Monomer)	5	< 5.0	< 5.0
Tetrachloroethene	5	< 5.0	< 5.0
Toluene	5	< 5.0	< 5.0
trans-1,2-Dichloroethene	5	< 5.0	< 5.0
trans-1,3-Dichloropropene	0.4	< 5.0	< 5.0
Trichloroethene	5	0.34 J	0.39 J
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0
Vinyl Chloride	2	< 2.0	< 2.0
Xylene - o	5	< 5.0	< 5.0
Xylenes - m,p	5	< 5.0	< 5.0
Total VOCs ⁽³⁾		1.3	1.5
Project VOCs ⁽⁴⁾		0.34	0.39

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	Sample Date:
	BCPMW-5-1	4/23/2009
NYSDEC		
<u>SCGs</u>		
1,1,1-Trichloroethane	5	< 100
1,1,1,2-Tetrachloroethane	5	< 100
1,1,2-Trichloroethane	1	< 100
1,1-Dichloroethane	5	< 100
1,1-Dichloroethene	5	21 J
1,2-Dichloroethane	0.6	< 100
1,2-Dichloropropane	1	< 100
2-Butanone	NE	< 1000
4-Methyl-2-Pentanone	50	< 1000
Acetone	NE	< 1000
Benzene	1	< 14
Bromodichloromethane	50	< 100
Bromoform	50	< 100
Bromomethane	5	< 100
Carbon Disulfide	60	< 100
Carbon Tetrachloride	5	< 100
Chlorobenzene	5	< 100
Chlorodibromomethane	50	< 100
Chlorodifluoromethane (Freon 22)	NE	< 100
Chloroethane	5	< 100
Chloroform	7	< 100
Chloromethane	5	< 100
cis-1,2-Dichloroethene	5	960
cis-1,3-Dichloropropene	0.4	< 100
Dichlorodifluoromethane (Freon 12)	5	< 100
Dichloromethane	5	< 100
Ethylbenzene	5	48 J
Methyl N-Butyl Ketone	50	< 1000
Methyl-Tert-Butylether	5	--
Styrene (Monomer)	5	< 100
Tetrachloroethene	5	< 100
Toluene	5	2700
trans-1,2-Dichloroethene	5	< 100
trans-1,3-Dichloropropene	0.4	< 100
Trichloroethene	5	220
Trichlorotrifluoroethane (Freon 113)	5	< 100
Vinyl Chloride	2	330
Xylene - o	5	40 J
Xylenes - m,p	5	110
Total VOCs ⁽³⁾		4,400
Project VOCs ⁽⁴⁾		4,400

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	BCPMW-6-1	BCPMW-6-1	BCPMW-6-1	BCPMW-6-1
	Sample Date:	4/20/2009	12/4/2009	10/6/2010	10/31/2011
NYSDEC					
<u>SCGs</u>					
1,1,1-Trichloroethane	5	< 5	< 5	< 100	< 250
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 100	< 250
1,1,2-Trichloroethane	1	< 5	< 5	< 100	< 250
1,1-Dichloroethane	5	0.3 J	< 5	< 100	< 250
1,1-Dichloroethene	5	< 5	< 5	< 100	< 250
1,2-Dichloroethane	0.6	< 5	< 5	< 100	< 250
1,2-Dichloropropane	1	< 5	< 5	< 100	< 250
2-Butanone	NE	< 50	< 50	< 1000	< 2500
4-Methyl-2-Pentanone	50	< 50 J	< 50	< 1000	< 2500
Acetone	NE	< 50 J	< 50	< 1000	< 2500
Benzene	1	< 0.7	< 0.7	< 14	< 35
Bromodichloromethane	50	< 5	< 5	< 100	< 250
Bromoform	50	< 5	< 5	< 100	< 250
Bromomethane	5	< 5	R	< 100	< 250
Carbon Disulfide	60	< 5	< 5	< 100	< 250
Carbon Tetrachloride	5	< 5	< 5	< 100	< 250
Chlorobenzene	5	< 5	< 5	< 100	< 250
Chlorodibromomethane	50	< 5	< 5	< 100	< 250
Chlorodifluoromethane (Freon 22)	NE	4500 D	1700 EJ	10000 D	7100
Chloroethane	5	< 5	< 5	< 100	< 250
Chloroform	7	1.7 J	0.32 J	< 100	< 250
Chloromethane	5	< 5	R	< 100	< 250
cis-1,2-Dichloroethene	5	21	1.7 J	< 100	< 250
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 100	< 250
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 100	< 250
Dichloromethane	5	< 5	< 5	< 100	< 250
Ethylbenzene	5	< 5	< 5	< 100	< 250
Methyl N-Butyl Ketone	50	< 50 J	< 50	< 1000	< 2500
Methyl-Tert-Butylether	5	--	--	< 100	< 250
Styrene (Monomer)	5	< 5	< 5	< 100	< 250
Tetrachloroethene	5	0.34 J	< 5	< 100	< 250
Toluene	5	< 5	< 5	< 100	< 250
trans-1,2-Dichloroethene	5	< 5	< 5	< 100	< 250
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 100	< 250
Trichloroethene	5	4.9 J	1.6 J	< 100	< 250
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 100	< 250
Vinyl Chloride	2	< 2	< 2	< 40	< 100
Xylene - o	5	< 5	< 5	< 100	< 250
Xylenes - m,p	5	< 5	< 5	< 100	< 250
Total VOCs ⁽³⁾		4,500	1,700	10,000	7,100
Project VOCs ⁽⁴⁾		27	2.3	0	0

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	BCPMW-6-1	BCPMW-6-1
	Sample Date:	10/3/2012	6/7/2013
NYSDEC			
<u>SCGs</u>			
1,1,1-Trichloroethane	5	< 100	< 13
1,1,2,2-Tetrachloroethane	5	< 100	< 13
1,1,2-Trichloroethane	1	< 100	< 13
1,1-Dichloroethane	5	< 100	< 13
1,1-Dichloroethene	5	< 100	< 13
1,2-Dichloroethane	0.6	< 100	< 13
1,2-Dichloropropane	1	< 100	< 13
2-Butanone	NE	< 1000	< 130
4-Methyl-2-Pentanone	50	< 1000	< 130
Acetone	NE	< 1000	< 130
Benzene	1	< 14	< 1.8
Bromodichloromethane	50	< 100	< 13
Bromoform	50	< 100	< 13
Bromomethane	5	< 100	< 13
Carbon Disulfide	60	< 100	< 13
Carbon Tetrachloride	5	< 100	< 13
Chlorobenzene	5	< 100	< 13
Chlorodibromomethane	50	< 100	< 13
Chlorodifluoromethane (Freon 22)	NE	2100	400
Chloroethane	5	< 100	< 13
Chloroform	7	< 100	< 13
Chloromethane	5	< 100	< 13
cis-1,2-Dichloroethene	5	< 100	< 13
cis-1,3-Dichloropropene	0.4	< 100	< 13
Dichlorodifluoromethane (Freon 12)	5	< 100	< 13
Dichloromethane	5	< 100	< 13
Ethylbenzene	5	< 100	< 13
Methyl N-Butyl Ketone	50	< 1000	< 130
Methyl-Tert-Butylether	5	< 100	< 13
Styrene (Monomer)	5	< 100	< 13
Tetrachloroethene	5	< 100	< 13
Toluene	5	< 100	< 13
trans-1,2-Dichloroethene	5	< 100	< 13
trans-1,3-Dichloropropene	0.4	< 100	< 13
Trichloroethene	5	< 100	< 13
Trichlorotrifluoroethane (Freon 113)	5	< 100	< 13
Vinyl Chloride	2	< 40	< 5.0
Xylene - o	5	< 100	< 13
Xylenes - m,p	5	< 100	< 13
Total VOCs ⁽³⁾		2,100	400
Project VOCs ⁽⁴⁾		0	0

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	BCPMW-6-2	BCPMW-6-2	BCPMW-6-2	BCPMW-6-2	BCPMW-6-2
	Sample Date:	5/8/2009	12/4/2009	10/6/2010	10/31/2011	10/3/2012
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	< 5	0.78 J	< 5	< 5	< 5
1,1,1,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	0.37 J	0.65 J	0.47 J	0.41 J	0.23 J
1,1-Dichloroethene	5	< 5	0.44 J	< 5	0.3 J	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone	50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	< 50	< 50	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	R	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	0.64 J
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	0.53 J	< 5	0.41 J	0.3 J	0.38 J
Chloromethane	5	< 5	R	< 5	< 5	< 5
cis-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone	50	< 50	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether	5	--	--	< 5	0.33 J	0.24 J
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	0.79 J	2.1 J	1.8 J	1.6 J
Toluene	5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	< 5	0.45 J	< 5	< 5	< 5
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2
Xylene - o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs ⁽³⁾		0.90	3.1	3.0	3.1	3.1
Project VOCs ⁽⁴⁾		0.37	3.1	2.6	2.5	1.8

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	Sample Date:
	BCPMW-6-2	6/5/2013
NYSDEC		
<u>SCGs</u>		
1,1,1-Trichloroethane	5	< 5.0
1,1,2,2-Tetrachloroethane	5	< 5.0
1,1,2-Trichloroethane	1	< 5.0
1,1-Dichloroethane	5	0.31 J
1,1-Dichloroethene	5	< 5.0 J
1,2-Dichloroethane	0.6	< 5.0
1,2-Dichloropropane	1	< 5.0
2-Butanone	NE	< 50
4-Methyl-2-Pentanone	50	< 50
Acetone	NE	< 50
Benzene	1	< 0.70 J
Bromodichloromethane	50	< 5.0
Bromoform	50	< 5.0
Bromomethane	5	< 5.0
Carbon Disulfide	60	< 5.0
Carbon Tetrachloride	5	< 5.0
Chlorobenzene	5	< 5.0 J
Chlorodibromomethane	50	< 5.0
Chlorodifluoromethane (Freon 22)	NE	< 5.0
Chloroethane	5	< 5.0
Chloroform	7	0.93 J
Chloromethane	5	< 5.0
cis-1,2-Dichloroethene	5	< 5.0
cis-1,3-Dichloropropene	0.4	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5.0
Dichloromethane	5	< 5.0
Ethylbenzene	5	< 5.0
Methyl N-Butyl Ketone	50	< 50
Methyl-Tert-Butylether	5	0.36 J
Styrene (Monomer)	5	< 5.0
Tetrachloroethene	5	1.3 J
Toluene	5	< 5.0 J
trans-1,2-Dichloroethene	5	< 5.0
trans-1,3-Dichloropropene	0.4	< 5.0
Trichloroethene	5	< 5.0 J
Trichlorotrifluoroethane (Freon 113)	5	< 5.0
Vinyl Chloride	2	< 2.0
Xylene - o	5	< 5.0
Xylenes - m,p	5	< 5.0
Total VOCs ⁽³⁾		2.9
Project VOCs ⁽⁴⁾		1.6

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	BCPMW-7-1	BCPMW-7-1	BCPMW-7-1	BCPMW-7-1	BCPMW-7-1
	Sample Date:	4/20/2009	12/1/2009	10/7/2010	11/1/2011	10/4/2012
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone	50	< 50 J	< 50	< 50	< 50	< 50
Acetone	NE	< 50	< 50	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	R	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	2.6 J	1.5 J	5.2	9.2	3.6 J
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	< 5	< 5	< 5	< 5	0.37 J
Chloromethane	5	< 5	R	< 5	< 5	< 5
cis-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone	50	< 50 J	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether	5	--	--	< 5	0.22 J	0.26 J
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	< 5	< 5	< 5
Toluene	5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	< 5	< 5	< 5	< 5	< 5
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2
Xylene - o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs ⁽³⁾		2.6	1.5	5.2	9.4	4.2
Project VOCs ⁽⁴⁾		0.0	0.0	0.0	0.2	0.0

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Sample Location: <i>BCPMW-7-1</i>		
Constituent in µg/L	Sample Date: <i>6/7/2013</i>	
	NYSDEC	
	<u>SCGs</u>	
1,1,1-Trichloroethane	5	< 5.0
1,1,2,2-Tetrachloroethane	5	< 5.0
1,1,2-Trichloroethane	1	< 5.0
1,1-Dichloroethane	5	< 5.0
1,1-Dichloroethene	5	< 5.0
1,2-Dichloroethane	0.6	< 5.0
1,2-Dichloropropane	1	< 5.0
2-Butanone	NE	< 50
4-Methyl-2-Pentanone	50	< 50
Acetone	NE	< 50
Benzene	1	< 0.70
Bromodichloromethane	50	< 5.0
Bromoform	50	< 5.0
Bromomethane	5	< 5.0
Carbon Disulfide	60	< 5.0
Carbon Tetrachloride	5	< 5.0
Chlorobenzene	5	< 5.0
Chlorodibromomethane	50	< 5.0
Chlorodifluoromethane (Freon 22)	NE	2.5 J
Chloroethane	5	< 5.0
Chloroform	7	0.29 J
Chloromethane	5	< 5.0
cis-1,2-Dichloroethene	5	< 5.0
cis-1,3-Dichloropropene	0.4	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5.0
Dichloromethane	5	< 5.0
Ethylbenzene	5	< 5.0
Methyl N-Butyl Ketone	50	< 50
Methyl-Tert-Butylether	5	0.22 J
Styrene (Monomer)	5	< 5.0
Tetrachloroethene	5	< 5.0
Toluene	5	< 5.0
trans-1,2-Dichloroethene	5	< 5.0
trans-1,3-Dichloropropene	0.4	< 5.0
Trichloroethene	5	< 5.0
Trichlorotrifluoroethane (Freon 113)	5	< 5.0
Vinyl Chloride	2	< 2.0
Xylene - o	5	< 5.0
Xylenes - m,p	5	< 5.0
Total VOCs ⁽³⁾		3.0
Project VOCs ⁽⁴⁾		0

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	MW-200-1	MW-200-1	MW-200-1	MW-200-1	MW-200-1
	Sample Date:	4/29/2009	12/2/2009	10/5/2010	11/3/2011	10/4/2012
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	0.79 J	< 5	< 5	< 5	< 5
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone	50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	< 50 B	< 50	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	R	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	< 5	< 5	< 5
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	2.3 J	2.3 J	0.5 J	0.21 J	< 5
Chloromethane	5	< 5	R	< 5	< 5	< 5
cis-1,2-Dichloroethene	5	38	5.7	3.5 J	11	1.5 J
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone	50	< 50	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether	5	--	--	< 5	< 5	< 5
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	0.54 J	< 5	< 5	0.43 J	< 5
Toluene	5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	5	0.3 J	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	34	12	7	20	3.8 J
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	< 5
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2
Xylene - o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs ⁽³⁾		76	20	11	32	5.3
Project VOCs ⁽⁴⁾		74	18	11	31	5.3

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Sample Location: MW-200-1		
Sample Date: 5/31/2013		
Constituent in µg/L		
NYSDEC		
<u>SCGs</u>		
1,1,1-Trichloroethane	5	< 5.0
1,1,2,2-Tetrachloroethane	5	< 5.0
1,1,2-Trichloroethane	1	< 5.0
1,1-Dichloroethane	5	< 5.0
1,1-Dichloroethene	5	< 5.0
1,2-Dichloroethane	0.6	< 5.0
1,2-Dichloropropane	1	< 5.0
2-Butanone	NE	< 50
4-Methyl-2-Pentanone	50	< 50
Acetone	NE	< 50
Benzene	1	< 0.70
Bromodichloromethane	50	< 5.0
Bromoform	50	< 5.0
Bromomethane	5	< 5.0
Carbon Disulfide	60	< 5.0
Carbon Tetrachloride	5	< 5.0
Chlorobenzene	5	< 5.0
Chlorodibromomethane	50	< 5.0
Chlorodifluoromethane (Freon 22)	NE	< 5.0
Chloroethane	5	< 5.0
Chloroform	7	< 5.0
Chloromethane	5	< 5.0
cis-1,2-Dichloroethene	5	0.41 J
cis-1,3-Dichloropropene	0.4	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5.0
Dichloromethane	5	< 5.0
Ethylbenzene	5	< 5.0
Methyl N-Butyl Ketone	50	< 50
Methyl-Tert-Butylether	5	< 5.0
Styrene (Monomer)	5	< 5.0
Tetrachloroethene	5	< 5.0
Toluene	5	< 5.0
trans-1,2-Dichloroethene	5	< 5.0
trans-1,3-Dichloropropene	0.4	< 5.0
Trichloroethene	5	1.3 J
Trichlorotrifluoroethane (Freon 113)	5	< 5.0
Vinyl Chloride	2	< 2.0
Xylene - o	5	< 5.0
Xylenes - m,p	5	< 5.0
Total VOCs ⁽³⁾		1.7
Project VOCs ⁽⁴⁾		1.7

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	MW-201-1	MW-201-1	MW-201-1	MW-201-1	MW-201-1
	Sample Date:	5/1/2009	12/2/2009	10/5/2010	11/3/2011	10/4/2012
NYSDEC						
SCGs						
1,1,1-Trichloroethane	5	5.5 J	3.3 J	< 50	< 5	< 5
1,1,2,2-Tetrachloroethane	5	< 25	< 50	< 50	< 5	< 5
1,1,2-Trichloroethane	1	< 25	< 50	< 50	< 5	< 5
1,1-Dichloroethane	5	10 J	9 J	14 J	0.51 J	1.2 J
1,1-Dichloroethene	5	7.9 J	8.1 J	6.9 J	0.21 J	0.65 J
1,2-Dichloroethane	0.6	< 25	< 50	< 50	< 5	< 5
1,2-Dichloropropane	1	< 25	< 50	< 50	< 5	< 5
2-Butanone	NE	< 250	< 500	< 500	< 50	< 50
4-Methyl-2-Pentanone	50	< 250	< 500	< 500	< 50	< 50
Acetone	NE	< 250 B	< 500	< 500	< 50	< 50
Benzene	1	< 3.5	< 7	< 7	< 0.7	< 0.7
Bromodichloromethane	50	< 25	< 50	< 50	< 5	< 5
Bromoform	50	< 25	< 50	< 50	< 5	< 5
Bromomethane	5	< 25	< 50	< 50	< 5	< 5
Carbon Disulfide	60	< 25	< 50	< 50	< 5	< 5
Carbon Tetrachloride	5	< 25	< 50	< 50	< 5	< 5
Chlorobenzene	5	< 25	< 50	< 50	< 5	< 5
Chlorodibromomethane	50	< 25	< 50	< 50	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 25	< 50	< 50	< 5	< 5
Chloroethane	5	< 25	< 50	< 50	< 5	< 5
Chloroform	7	< 25	< 50	4.2 J	3.2 J	2.9 J
Chloromethane	5	< 25	R	< 50	< 5	< 5
cis-1,2-Dichloroethene	5	970 D	1300	3900 D	61	180 D
cis-1,3-Dichloropropene	0.4	< 25	< 50	< 50	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 25	< 50	< 50	< 5	< 5
Dichloromethane	5	< 25	< 50	< 50	< 5	< 5
Ethylbenzene	5	< 25	< 50	< 50	< 5	< 5
Methyl N-Butyl Ketone	50	< 250	< 500	< 500	< 50	< 50
Methyl-Tert-Butylether	5	--	--	<50	0.75 J	0.22 J
Styrene (Monomer)	5	< 25	< 50	< 50	< 5	< 5
Tetrachloroethene	5	< 25	< 50	< 50	0.24 J	0.24 J
Toluene	5	< 25	< 50	< 50	< 5 J	< 5
trans-1,2-Dichloroethene	5	2.7 J	3.5 J	6.7 J	< 5	0.59 J
trans-1,3-Dichloropropene	0.4	< 25	< 50	< 50	< 5	< 5
Trichloroethene	5	160	230	72	20	20
Trichlorotrifluoroethane (Freon 113)	5	< 25	< 50	< 50 U	< 5	< 5
Vinyl Chloride	2	< 10	38	820	< 2 U	13
Xylene - o	5	< 25	< 50	7.2 J	< 5	< 5
Xylenes - m,p	5	< 25	< 50	< 50	< 5	< 5
Total VOCs ⁽³⁾		1,200	1,600	4,800	86	220
Project VOCs ⁽⁴⁾		1,200	1,600	4,800	82	220

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Sample Location: MW-201-1		
Sample Date: 5/31/2013		
Constituent in µg/L		
NYSDEC		
<u>SCGs</u>		
1,1,1-Trichloroethane	5	< 5.0
1,1,2,2-Tetrachloroethane	5	< 5.0
1,1,2-Trichloroethane	1	< 5.0
1,1-Dichloroethane	5	< 5.0
1,1-Dichloroethene	5	< 5.0
1,2-Dichloroethane	0.6	< 5.0
1,2-Dichloropropane	1	< 5.0
2-Butanone	NE	< 50
4-Methyl-2-Pentanone	50	< 50
Acetone	NE	< 50
Benzene	1	< 0.70
Bromodichloromethane	50	< 5.0
Bromoform	50	< 5.0
Bromomethane	5	< 5.0
Carbon Disulfide	60	< 5.0
Carbon Tetrachloride	5	< 5.0
Chlorobenzene	5	< 5.0
Chlorodibromomethane	50	< 5.0
Chlorodifluoromethane (Freon 22)	NE	< 5.0
Chloroethane	5	< 5.0
Chloroform	7	0.49 J
Chloromethane	5	< 5.0
cis-1,2-Dichloroethene	5	7.9
cis-1,3-Dichloropropene	0.4	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5.0
Dichloromethane	5	< 5.0
Ethylbenzene	5	< 5.0
Methyl N-Butyl Ketone	50	< 50
Methyl-Tert-Butylether	5	< 5.0
Styrene (Monomer)	5	< 5.0
Tetrachloroethene	5	< 5.0
Toluene	5	< 5.0
trans-1,2-Dichloroethene	5	< 5.0
trans-1,3-Dichloropropene	0.4	< 5.0
Trichloroethene	5	13
Trichlorotrifluoroethane (Freon 113)	5	< 5.0
Vinyl Chloride	2	< 2.0
Xylene - o	5	< 5.0
Xylenes - m,p	5	< 5.0
Total VOCs ⁽³⁾		21
Project VOCs ⁽⁴⁾		21

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	MW-202-1	MW-202-1	MW-202-1	MW-202-1	MW-202-1
	Sample Date:	5/1/2009	12/2/2009	10/6/2010	11/3/2011	10/4/2012
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	0.32 J	0.74 J
1,1,1,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	0.86 J	2.1 J
1,1-Dichloroethene	5	< 5	< 5	< 5	0.72 J	1.9 J
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone	50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	< 50	< 50	< 50	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	< 5	< 5	0.61 J	0.21 J	< 5
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	6.2	6.7	0.93 J	< 5	< 5
Chloromethane	5	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	5	0.64 J	0.58 J	< 5	< 5	0.4 J
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone	50	< 50	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether	5	--	--	< 5	0.37 J	< 5
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	0.48 J	0.92 J	1.7 J
Toluene	5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	7.5	9.3	2.4 J	0.78 J	1.2 J
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	0.43 J	0.44 J	0.76 J
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2
Xylene - o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs ⁽³⁾		14	17	4.9	4.6	8.8
Project VOCs ⁽⁴⁾		8.1	9.9	2.9	3.6	8.0

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Sample Location: <i>MW-202-1</i>		
Constituent in µg/L	Sample Date:	<i>5/30/2013</i>
NYSDEC		
<u>SCGs</u>		
1,1,1-Trichloroethane	5	0.93 J
1,1,1,2-Tetrachloroethane	5	< 5.0
1,1,2-Trichloroethane	1	< 5.0
1,1-Dichloroethane	5	3.0 J
1,1-Dichloroethene	5	2.3 J
1,2-Dichloroethane	0.6	< 5.0
1,2-Dichloropropane	1	< 5.0
2-Butanone	NE	< 50
4-Methyl-2-Pentanone	50	< 50
Acetone	NE	< 50
Benzene	1	< 0.70
Bromodichloromethane	50	< 5.0
Bromoform	50	< 5.0
Bromomethane	5	< 5.0
Carbon Disulfide	60	< 5.0
Carbon Tetrachloride	5	< 5.0
Chlorobenzene	5	< 5.0
Chlorodibromomethane	50	< 5.0
Chlorodifluoromethane (Freon 22)	NE	< 5.0
Chloroethane	5	< 5.0
Chloroform	7	< 5.0
Chloromethane	5	< 5.0
cis-1,2-Dichloroethene	5	0.63 J
cis-1,3-Dichloropropene	0.4	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5.0
Dichloromethane	5	< 5.0
Ethylbenzene	5	< 5.0
Methyl N-Butyl Ketone	50	< 50
Methyl-Tert-Butylether	5	< 5.0
Styrene (Monomer)	5	< 5.0
Tetrachloroethene	5	2.8 J
Toluene	5	< 5.0
trans-1,2-Dichloroethene	5	< 5.0
trans-1,3-Dichloropropene	0.4	< 5.0
Trichloroethene	5	1.6 J
Trichlorotrifluoroethane (Freon 113)	5	1.4 J
Vinyl Chloride	2	< 2.0
Xylene - o	5	< 5.0
Xylenes - m,p	5	< 5.0
Total VOCs ⁽³⁾		13
Project VOCs ⁽⁴⁾		11

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	MW-203-1	MW-203-1	MW-203-1	MW-203-1	MW-203-1
	Sample Date:	5/1/2009	12/2/2009	10/5/2010	11/1/2011	10/3/2012
NYSDEC						
<u>SCGs</u>						
1,1,1-Trichloroethane	5	< 5	< 5	< 5	< 5	0.26 J
1,1,1,2-Tetrachloroethane	5	< 5	< 5	< 5	< 5	< 5
1,1,2-Trichloroethane	1	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	5	< 5	< 5	< 5	0.32 J	1 J
1,1-Dichloroethene	5	< 5	< 5	< 5	< 5	0.44 J
1,2-Dichloroethane	0.6	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	1	< 5	< 5	< 5	< 5	< 5
2-Butanone	NE	< 50	< 50	< 50	< 50	< 50
4-Methyl-2-Pentanone	50	< 50	< 50	< 50	< 50	< 50
Acetone	NE	< 50 B	< 50	< 50 B	< 50	< 50
Benzene	1	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Bromodichloromethane	50	< 5	< 5	< 5	< 5	< 5
Bromoform	50	< 5	< 5	< 5	< 5	< 5
Bromomethane	5	< 5	< 5	< 5	< 5	< 5
Carbon Disulfide	60	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane	50	< 5	< 5	< 5	< 5	< 5
Chlorodifluoromethane (Freon 22)	NE	73	17	29	8.9	3.6 J
Chloroethane	5	< 5	< 5	< 5	< 5	< 5
Chloroform	7	7.9	2.6 J	1.5 J	0.68 J	0.36 J
Chloromethane	5	< 5	< 5	< 5	< 5	< 5
cis-1,2-Dichloroethene	5	1.6 J	0.83 J	0.97 J	1.4 J	0.62 J
cis-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Dichlorodifluoromethane (Freon 12)	5	< 5	< 5	< 5	< 5	< 5
Dichloromethane	5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	5	< 5	< 5	< 5	< 5	< 5
Methyl N-Butyl Ketone	50	< 50	< 50	< 50	< 50	< 50
Methyl-Tert-Butylether	5	--	--	0.88 J	0.41 J	0.21 J
Styrene (Monomer)	5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethene	5	< 5	< 5	< 5	0.35 J	0.59 J
Toluene	5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	5	< 5	< 5	< 5	< 5	< 5
trans-1,3-Dichloropropene	0.4	< 5	< 5	< 5	< 5	< 5
Trichloroethene	5	1.3 J	0.7 J	1.6 J	2.9 J	1.8 J
Trichlorotrifluoroethane (Freon 113)	5	< 5	< 5	< 5	< 5	1.1 J
Vinyl Chloride	2	< 2	< 2	< 2	< 2	< 2
Xylene - o	5	< 5	< 5	< 5	< 5	< 5
Xylenes - m,p	5	< 5	< 5	< 5	< 5	< 5
Total VOCs ⁽³⁾		84	21	34	15	10
Project VOCs ⁽⁴⁾		2.9	1.5	2.6	5	4.7

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Constituent in µg/L	Sample Location:	<i>MW-203-1 (REP)</i>	<i>MW-203-1</i>
	Sample Date:	<i>5/31/2013</i>	<i>5/31/2013</i>
	NYSDEC		
	<u>SCGs</u>		
1,1,1-Trichloroethane	5	< 5.0	0.25 J
1,1,2,2-Tetrachloroethane	5	< 5.0	< 5.0
1,1,2-Trichloroethane	1	< 5.0	< 5.0
1,1-Dichloroethane	5	0.98 J	1.1 J
1,1-Dichloroethene	5	0.47 J	0.46 J
1,2-Dichloroethane	0.6	< 5.0	< 5.0
1,2-Dichloropropane	1	< 5.0	< 5.0
2-Butanone	NE	< 50	< 50
4-Methyl-2-Pentanone	50	< 50	< 50
Acetone	NE	< 50	< 50
Benzene	1	< 0.70	< 0.70
Bromodichloromethane	50	< 5.0	< 5.0
Bromoform	50	< 5.0	< 5.0
Bromomethane	5	< 5.0	< 5.0
Carbon Disulfide	60	< 5.0	< 5.0
Carbon Tetrachloride	5	< 5.0	< 5.0
Chlorobenzene	5	< 5.0	< 5.0
Chlorodibromomethane	50	< 5.0	< 5.0
Chlorodifluoromethane (Freon 22)	NE	3.5 J	3.2 J
Chloroethane	5	< 5.0	< 5.0
Chloroform	7	0.28 J	0.27 J
Chloromethane	5	< 5.0	< 5.0
cis-1,2-Dichloroethene	5	0.39 J	0.24 J
cis-1,3-Dichloropropene	0.4	< 5.0	< 5.0
Dichlorodifluoromethane (Freon 12)	5	< 5.0	< 5.0
Dichloromethane	5	< 5.0	< 5.0
Ethylbenzene	5	< 5.0	< 5.0
Methyl N-Butyl Ketone	50	< 50	< 50
Methyl-Tert-Butylether	5	0.24 J	0.24 J
Styrene (Monomer)	5	< 5.0	< 5.0
Tetrachloroethene	5	0.93 J	1.1 J
Toluene	5	< 5.0	< 5.0
trans-1,2-Dichloroethene	5	< 5.0	< 5.0
trans-1,3-Dichloropropene	0.4	< 5.0	< 5.0
Trichloroethene	5	2.5 J	2.7 J
Trichlorotrifluoroethane (Freon 113)	5	1.1 J	1.4 J
Vinyl Chloride	2	< 2.0	< 2.0
Xylene - o	5	< 5.0	< 5.0
Xylenes - m,p	5	< 5.0	< 5.0
Total VOCs ⁽³⁾		10	11
Project VOCs ⁽⁴⁾		5.3	5.9

See notes on last page.

Table 13. Concentrations of Volatile Organic Compounds in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2)

Notes:

- (1) Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).
- (2) Samples analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory for TCL VOCs using NYSDEC ASP 2005 Method OLM4.3.
- (3) "Total VOCs" represents the sum of individual concentrations of the VOCs detected. Results are rounded to two significant figures.
- (4) "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and xylenes-o, m, and p.

Acronyms\Key:

Indicates an exceedance of an SCG.

Bold value indicates a detection.

Italicized samples collected in 2013.

- RI/FS Remedial Investigation/Feasibility Study.
- NYSDEC New York State Department of Environmental Conservation.
- TCL Target compound list.
- VOC Volatile Organic Compound.
- ASP Analytical services protocol.
- SCGs Standards, criteria, and guidance values.
- µg/L Micrograms per liter.
- NE Not established.
- E Concentration for the compound exceeded the calibration range.
- J Compound detected but below its reporting limit; the value is estimated.
- D Compound identified from secondary dilution.
- R Concentration for the compound was rejected.
- B Compound detected in associated blank sample.
- < 5 Compound not detected above its laboratory quantification limit.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.^(1,2)

Constituent in µg/L	Sample Location:	B24MW-2	B24MW-3	BCPMW-1	BCPMW-2	BCPMW-3	BCPMW-4-1	BCPMW-4-1	BCPMW-4-1
	Sample Date:	4/23/2009	4/20/2009	4/28/2009	4/28/2009	4/29/2009	4/17/2009	10/4/2010	10/28/2011
	NYSDEC <u>SCGs</u>								
Cadmium, Total	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium, Dissolved	5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chromium, Total	50	40.3	28.2	20.8	< 10	< 10	22.7	43	25
Chromium, Dissolved	50	< 10	10.6	< 10	< 10	< 10	12.8	41	22
Iron (total)	300	--	597	--	< 100	2,080	103	--	--
Iron (dissolved)	300	--	< 100	--	< 100	1,760	< 100	--	--
Manganese (total)	300	--	16.9	--	12.7	51.4	11.2	--	--
Manganese (dissolved)	300	--	13.7	--	11.3	49.2	< 10	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.^(1,2)

COMPOUND (µg/L)	Sample Location:	BCPMW-4-1	BCPMW-4-1	BCPMW-4-1	BCPMW-4-2	BCPMW-4-2	BCPMW-4-2	BCPMW-4-2	BCPMW-4-2	BCPMW-4-2
	Sample Date:	10/3/2012	10/4/2012	6/5/2013	4/17/2009	10/7/2010	10/28/2011	10/3/2012	10/4/2012	6/5/2013
	NYSDEC <u>SCGs</u>									
Cadmium (total)	5	< 5	--	< 5.0	< 5	< 5	< 5	< 5	--	< 5.0
Cadmium (dissolved)	5	--	< 5	< 5.0	< 5	--	< 5	--	< 5	< 5.0
Chromium (total)	50	32	--	16.1	10.6	< 10	< 10	< 10	--	< 10
Chromium (dissolved)	50	--	26	13.1	< 10	--	< 10	--	< 10	< 10
Iron (total)	300	--	--	--	4,630	--	--	--	--	--
Iron (dissolved)	300	--	--	--	4,080	--	--	--	--	--
Manganese (total)	300	--	--	--	228	--	--	--	--	--
Manganese (dissolved)	300	--	--	--	217	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.^(1,2)

COMPOUND (µg/L)	Sample Location:	BCPMW-4-3	BCPMW-4-3	BCPMW-4-3	BCPMW-4-3	BCPMW-4-3	BCPMW-4-3 (REP)	BCPMW-4-3
	Sample Date:	4/17/2009	10/7/2010	10/28/2011	10/3/2012	10/4/2012	6/5/2013	6/5/2013
	NYSDEC <u>SCGs</u>							
Cadmium (total)	5	< 5	< 5	< 5	< 5	--	< 5.0	< 5.0
Cadmium (dissolved)	5	< 5	< 5	< 5	--	< 5	< 5.0	< 5.0
Chromium (total)	50	< 10	< 10	< 10	< 10	--	< 10	< 10
Chromium (dissolved)	50	< 10	< 10	< 10	--	< 10	< 10	< 10
Iron (total)	300	< 100	--	--	--	--	--	--
Iron (dissolved)	300	< 100	--	--	--	--	--	--
Manganese (total)	300	< 10	--	--	--	--	--	--
Manganese (dissolved)	300	< 10	--	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.^(1,2)

COMPOUND (µg/L)	Sample Location:	BCPMW-5-1	BCPMW-6-1	BCPMW-6-1	BCPMW-6-1	BCPMW-6-1	BCPMW-6-1	BCPMW-6-1	BCPMW-6-2
	Sample Date:	4/23/2009	4/20/2009	10/6/2010	10/31/2011	10/3/2012	10/4/2012	6/7/2013	5/8/2009
	NYSDEC								
	<u>SCGs</u>								
Cadmium (total)	5	< 5	< 5	<5	< 5	< 5	--	< 5.0	< 5
Cadmium (dissolved)	5	< 5	< 5	<5	< 5	--	< 5	< 5.0	< 5
Chromium (total)	50	< 10	< 10	< 10	14	< 10	--	< 10	10.3
Chromium (dissolved)	50	< 10	< 10	<10	< 10	--	< 10	< 10	< 10
Iron (total)	300	7,420	< 100	--	--	--	--	--	--
Iron (dissolved)	300	6,370	< 100	--	--	--	--	--	--
Manganese (total)	300	145	< 10	--	--	--	--	--	--
Manganese (dissolved)	300	131	< 10	--	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.^(1,2)

COMPOUND (µg/L)	Sample Location:	BCPMW-6-2	BCPMW-6-2	BCPMW-6-2	BCPMW-6-2	BCPMW-6-2	BCPMW-7-1	BCPMW-7-1	BCPMW-7-1	BCPMW-7-1
	Sample Date:	10/6/2010	10/31/2011	10/3/2012	10/4/2012	6/5/2013	4/20/2009	10/7/2010	11/1/2011	10/4/2012
	NYSDEC <u>SCGs</u>									
Cadmium (total)	5	<5	<5	< 5	--	< 5.0	< 5	< 5	< 5	< 5
Cadmium (dissolved)	5	<5	<5		< 5	< 5.0	< 5	< 5	< 5	< 5
Chromium (total)	50	<10	<10	< 10	--	< 10	< 10	< 10	< 10	< 10
Chromium (dissolved)	50	<10	<10		< 10	< 10	< 10	< 10	< 10	< 10
Iron (total)	300	--	--	--	--	--	< 100	--	--	--
Iron (dissolved)	300	--	--	--	--	--	< 100	--	--	--
Manganese (total)	300	--	--	--	--	--	106	--	--	--
Manganese (dissolved)	300	--	--	--	--	--	94.8	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.^(1,2)

COMPOUND (µg/L)	Sample Location:	BCPMW-7-1	MW-200-1	MW-200-1	MW-200-1	MW-200-1 ⁽³⁾	MW-200-1	MW-200-1	MW-201-1	MW-201-1
	Sample Date:	6/7/2013	4/29/2009	10/5/2010	11/3/2011	10/4/2012	4/15/2013	5/31/2013	5/1/2009	10/5/2010
	NYSDEC <u>SCGs</u>									
Cadmium (total)	5	< 5.0	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5
Cadmium (dissolved)	5	< 5.0	< 5	< 5	< 5	< 5	--	< 5	< 5	< 5
Chromium (total)	50	< 10	< 10	14	48	1,130	86	15.7	< 10	< 10
Chromium (dissolved)	50	< 10	< 10	< 10	13	320	21	< 10	< 10	< 10
Iron (total)	300	--	--	--	--	--	--	--	--	--
Iron (dissolved)	300	--	--	--	--	--	--	--	--	--
Manganese (total)	300	--	--	--	--	--	--	--	--	--
Manganese (dissolved)	300	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.^(1,2)

COMPOUND (µg/L)	Sample Location:	MW-201-1	MW-201-1 ⁽³⁾	MW-201-1	MW-201-1	MW-202-1	MW-202-1	MW-202-1	MW-202-1 ⁽³⁾	MW-202-1	MW-202-1
	Sample Date:	11/3/2011	10/4/2012	4/16/2013	5/31/2013	5/1/2009	10/6/2010	11/3/2011	10/4/2012	4/16/2013	5/30/2013
	NYSDEC										
	<u>SCGs</u>										
Cadmium (total)	5	< 5	< 5	--	< 5	< 5	< 5	< 5	< 5	--	< 5
Cadmium (dissolved)	5	< 5	< 5	--	< 5	< 5	< 5	< 5	< 5	--	< 5
Chromium (total)	50	< 10	159	28	< 10	16.5	15	23	263 J	19	34.3
Chromium (dissolved)	50	< 10	42	17	< 10	< 10	< 10	< 10	22	< 10	< 10
Iron (total)	300	--	--	--	--	--	--	--	--	--	--
Iron (dissolved)	300	--	--	--	--	--	--	--	--	--	--
Manganese (total)	300	--	--	--	--	--	--	--	--	--	--
Manganese (dissolved)	300	--	--	--	--	--	--	--	--	--	--

See notes on last page.

Table 14. Concentrations of Metals in Groundwater Samples Collected from Monitoring Wells, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.^(1,2)

COMPOUND (µg/L)	Sample Location: Sample Date:	MW-203-1 5/1/2009	MW-203-1 10/5/2010	MW-203-1 11/1/2011	MW-203-1 ⁽³⁾ 10/3/2012	MW-203-1 10/4/2012	MW-203-1 4/16/2013	MW-203-1(REP) 5/31/2013	MW-203-1 5/31/2013
NYSDEC <u>SCGs</u>									
Cadmium (total)	5	< 5	< 5	< 5	< 5	--	--	< 5	< 5
Cadmium (dissolved)	5	< 5	< 5	< 5	--	< 5	--	< 5	< 5
Chromium (total)	50	31.5	31	37	1,600	--	155	38.2	29.5
Chromium (dissolved)	50	< 10	< 10	< 10	--	84	<10	< 10	< 10
Iron (total)	300	--	--	--	--	--	--	--	--
Iron (dissolved)	300	--	--	--	--	--	--	--	--
Manganese (total)	300	--	--	--	--	--	--	--	--
Manganese (dissolved)	300	--	--	--	--	--	--	--	--

Notes:

- (1) Results validated following protocols specified in Sampling and Analysis Plan in the December 2009 DRAFT OM&M Manual (ARCADIS 2009).
- (2) Samples analyzed by a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory for metals using USEPA Method 6010.
- (3) Samples collected with HydraSleeve™ no purge method, all other samples collected by purge (3-Volume) method.

Acronyms/Key:

Indicates an exceedance of an SCG.

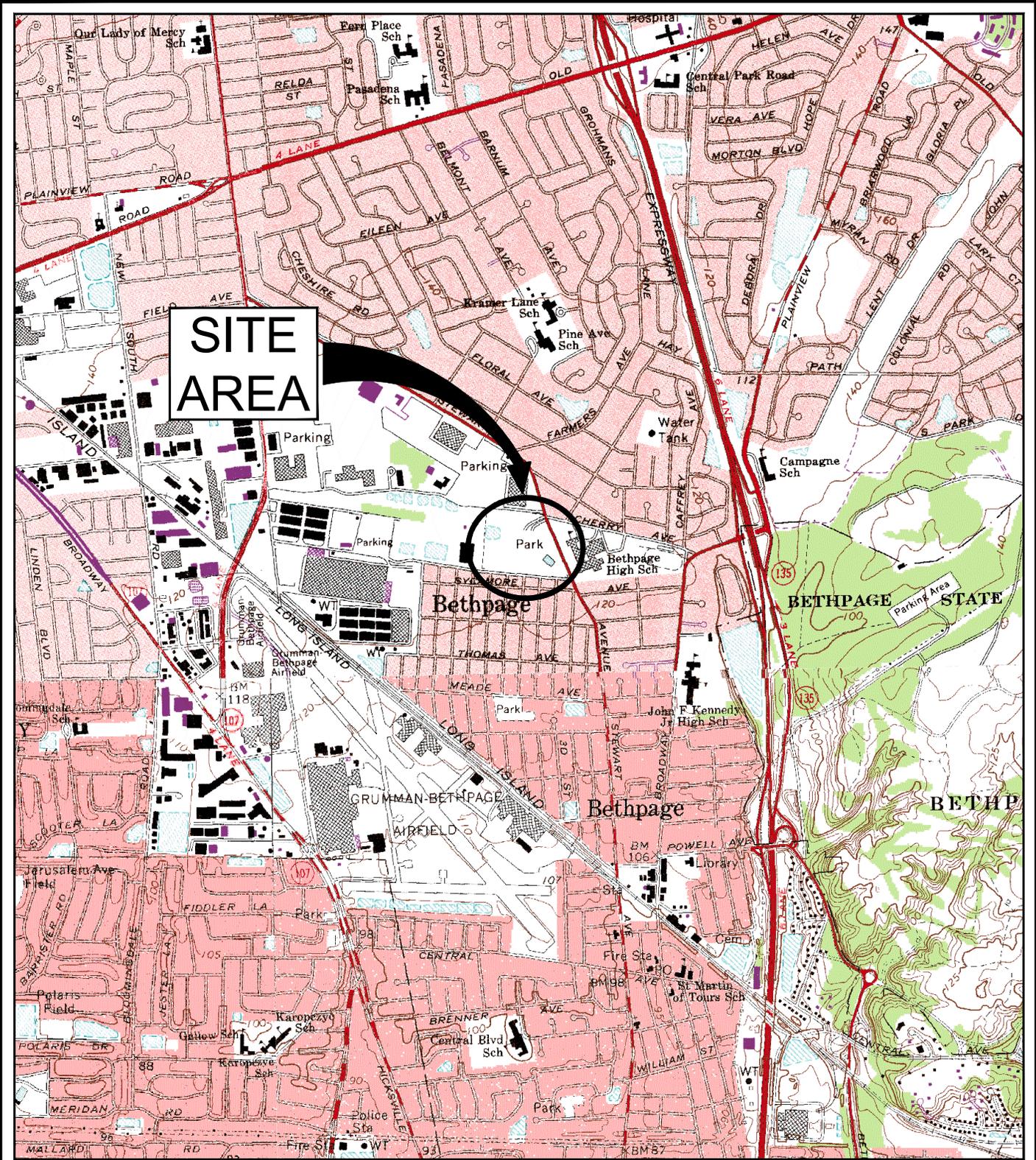
Bold value indicates a detection.

Italicized samples collected in 2013.

- RI/FS Remedial Investigation/Feasibility Study.
- NYSDEC New York State Department of Environmental Conservation.
- USEPA U.S. Environmental Protection Agency
- SCGs Standards, criteria, and guidance values.
- µg/L Micrograms per liter.
- Not analyzed.
- < 5 Compound not detected above its laboratory quantification limit.

Figures

CITY:SYRACUSE,NY DIV:GROUP:ENV DB:A.SANCHEZ LD: PIC:(Opt) PM:(Read) TM:(Opt) Lyr:(Opt)ONH*-OFF*-REF* PLOTSTYLETABLE: --- PLOTTED: 3/27/2014 4:31 PM BY: SANCHEZ, ADRIAN
 G:\ENV\CAD\STRACUSE\ACT\1001496\0312\G\M\H\DO\NY1496_B01.dwg LAYOUT: BETHPAGE PARK SAVED: 3/27/2014 4:16 PM ACADVER: 18 (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: --- PLOTTED: 3/27/2014 4:31 PM BY: SANCHEZ, ADRIAN

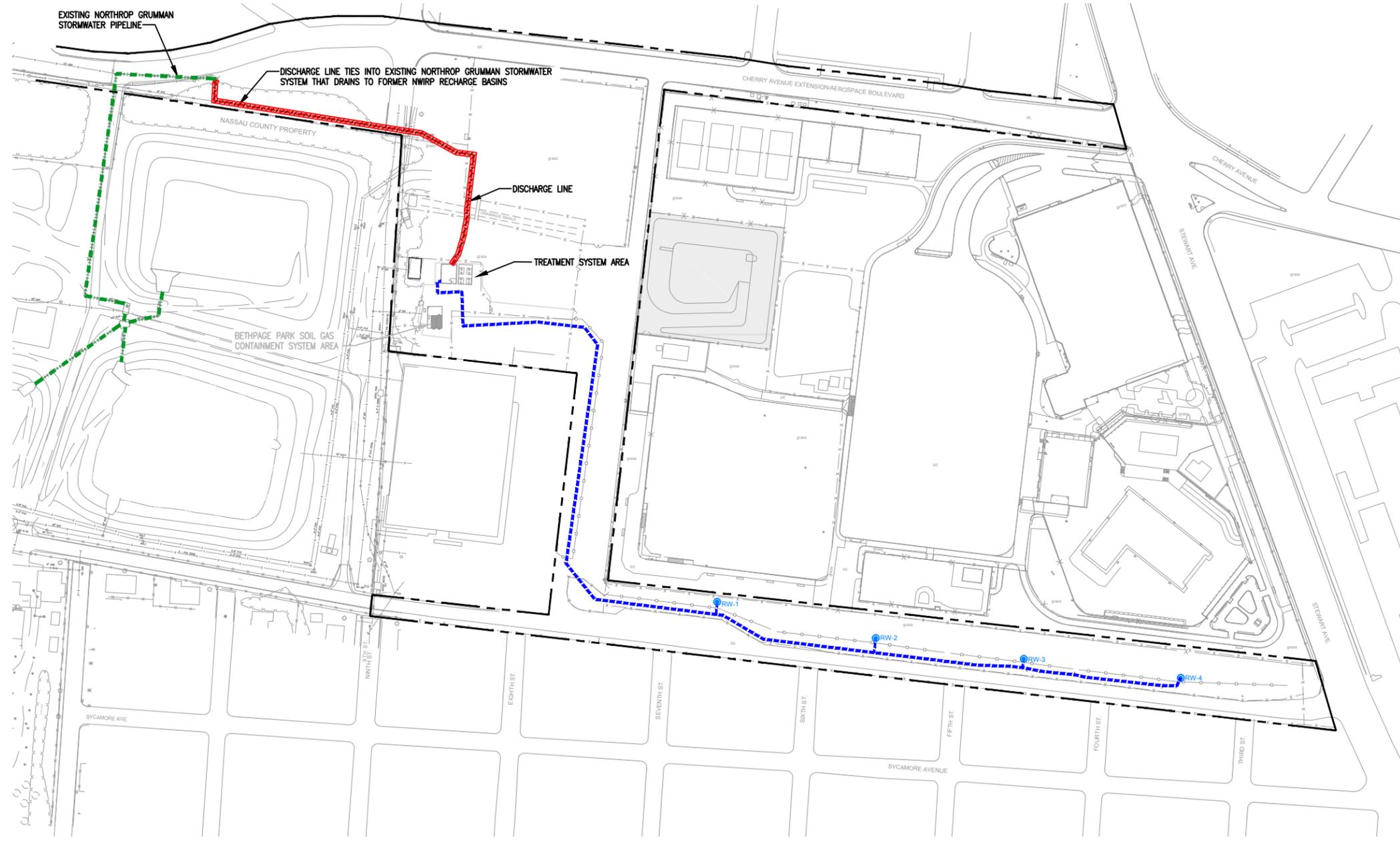


SOURCE:
 USGS 7.5 MIN. AMITYVILLE QUADRANGLE, AMITYVILLE, N.Y., 1994, FREEPORT QUADRANGLE, FREEPORT, N.Y., 1994,
 HICKSVILLE QUADRANGLE, HICKSVILLE, N.Y., 1967, PHOTOREVISED 1979, HUNTINGTON, N.Y., 1967, PHOTOREVISED 1979



BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM OPERABLE UNIT 3 (FORMER GRUMMAN SETTLING PONDS) BETHPAGE, NEW YORK	
SITE LOCATION	
	FIGURE 1

CITY:SYRACUSE-NY DIV:GROUP:ENV DBA:SANCHEZ LD:AS PIC:(Opt) PM:(Red) LVR:OPTION:OFF=REF
 G:\ENVCAD\SYRACUSE\ACT\NY00498\114\COMM\N1498B01.DWG LAYOUT: 2 SAVED: 11/4/2014 10:16 AM ACADVER: 18.1S (LMS TECH) PAGES: 20 PLOTSTYLETABLE: PLOTSETUP: 18.1S (LMS TECH) PAGES: 20 PLOTTED: 11/4/2014 10:21 AM BY: SANCHEZ, ADRIAN
 XREFS: IMAGES: PROJECTNAME: 1498B01



- LEGEND:**
- NORTHROP GRUMMAN PROPERTY LINE
 - - - - - FENCE
 - bit. BITUMINOUS PAVEMENT
 - INFLUENT PIPELINE AND ELECTRICAL CONDUITS
 - EFFLUENT PIPELINE
 - EXISTING NORTHROP GRUMMAN STORMWATER PIPELINE
 - RW-4 REMEDIAL WELL
 - NWIRP NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NOW OWNED BY NASSAU COUNTY)

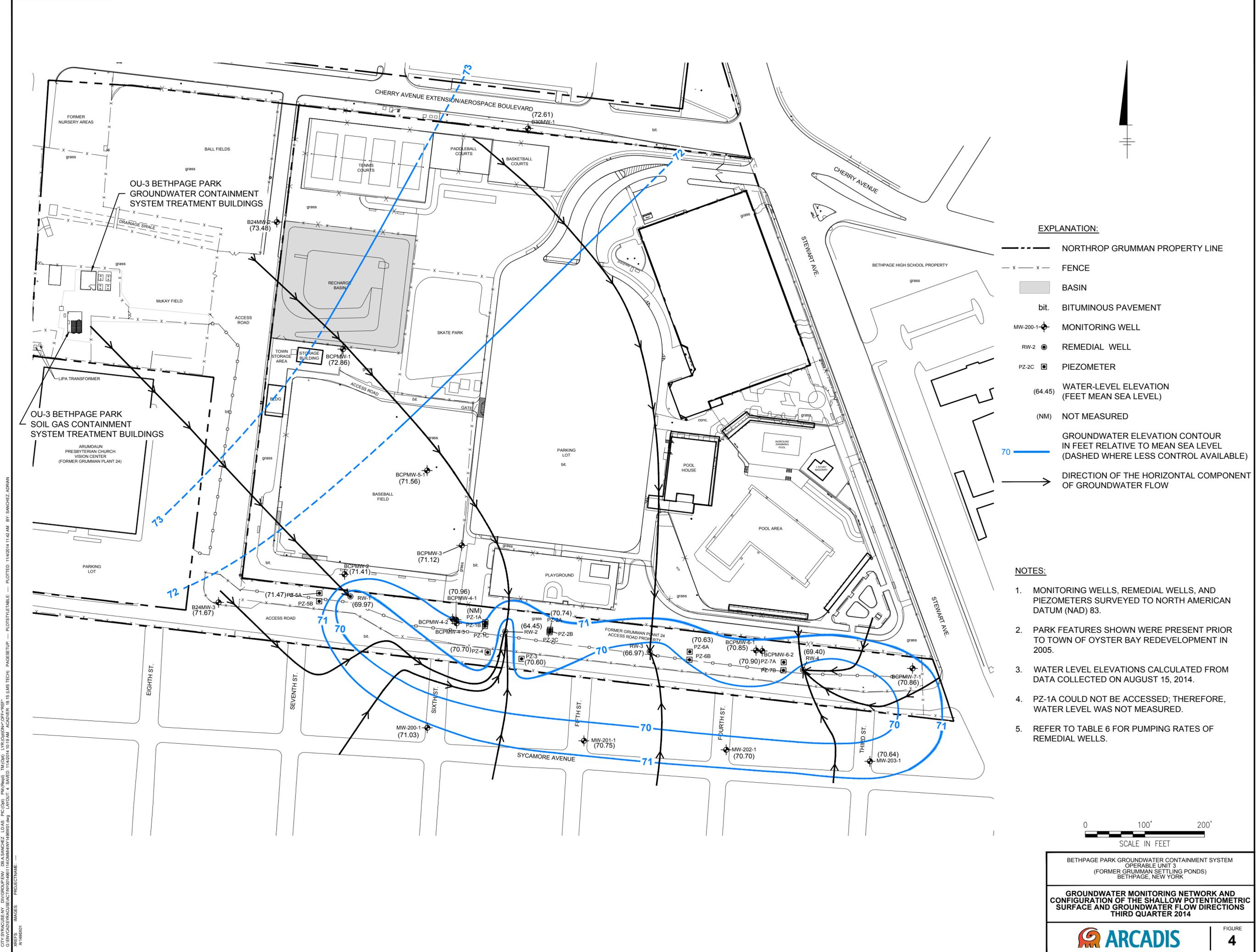


BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
 OPERABLE UNIT 3
 (FORMER GRUMMAN SETTLING PONDS)
 BETHPAGE, NEW YORK

**SITE AND
 GROUNDWATER CONTAINMENT SYSTEM**



FIGURE
2



EXPLANATION:

- — — — — NORTHROP GRUMMAN PROPERTY LINE
- x - x - FENCE
- BASIN
- bit. BITUMINOUS PAVEMENT
- MW-200-1 ◊ MONITORING WELL
- RW-2 ● REMEDIAL WELL
- PZ-2C ◻ PIEZOMETER
- (64.45) WATER-LEVEL ELEVATION (FEET MEAN SEA LEVEL)
- (NM) NOT MEASURED
- 70 ——— GROUNDWATER ELEVATION CONTOUR IN FEET RELATIVE TO MEAN SEA LEVEL (DASHED WHERE LESS CONTROL AVAILABLE)
- DIRECTION OF THE HORIZONTAL COMPONENT OF GROUNDWATER FLOW

NOTES:

1. MONITORING WELLS, REMEDIAL WELLS, AND PIEZOMETERS SURVEYED TO NORTH AMERICAN DATUM (NAD) 83.
2. PARK FEATURES SHOWN WERE PRESENT PRIOR TO TOWN OF OYSTER BAY REDEVELOPMENT IN 2005.
3. WATER LEVEL ELEVATIONS CALCULATED FROM DATA COLLECTED ON AUGUST 15, 2014.
4. PZ-1A COULD NOT BE ACCESSED; THEREFORE, WATER LEVEL WAS NOT MEASURED.
5. REFER TO TABLE 6 FOR PUMPING RATES OF REMEDIAL WELLS.

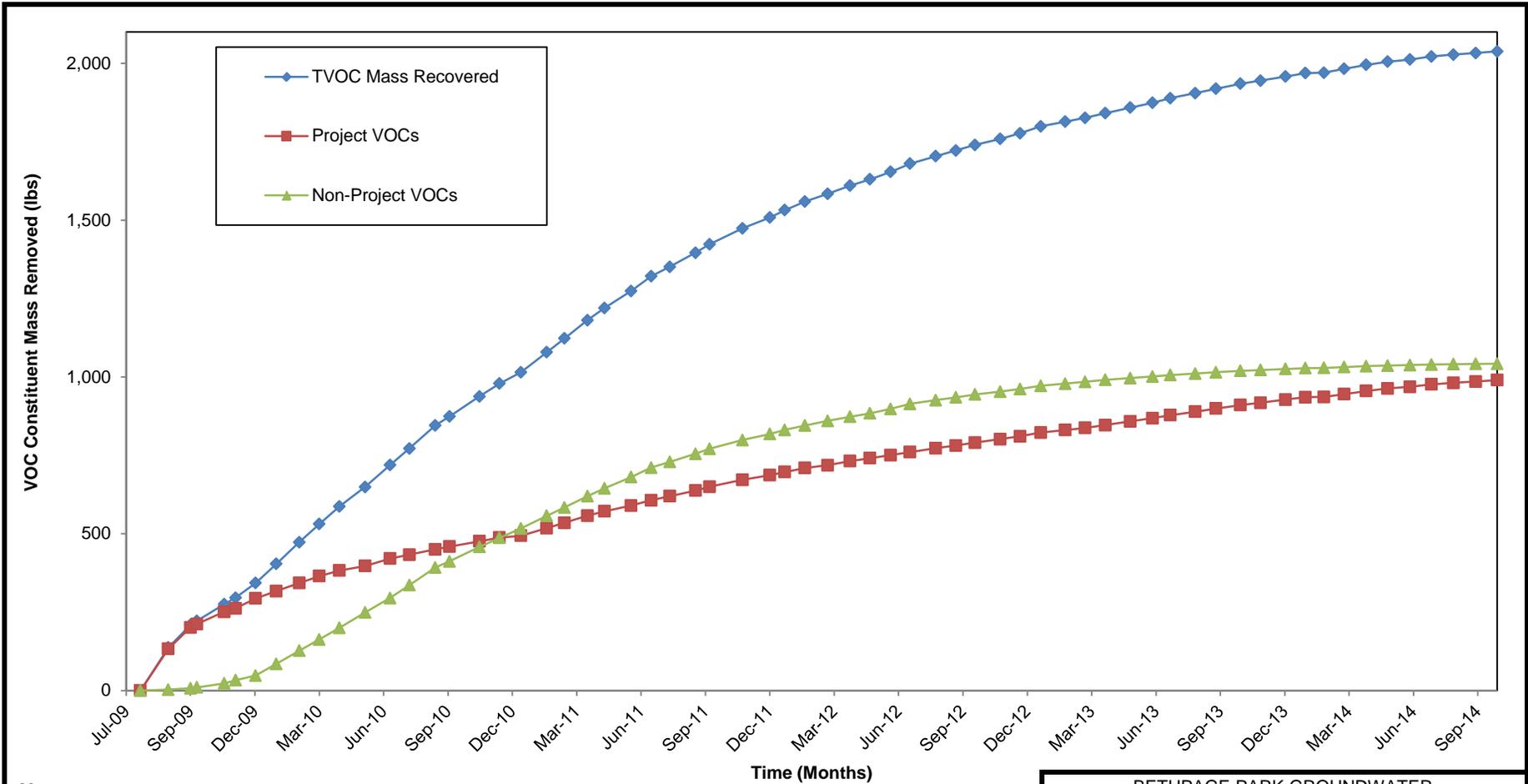


BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

GROUNDWATER MONITORING NETWORK AND
CONFIGURATION OF THE SHALLOW POTENTIOMETRIC
SURFACE AND GROUNDWATER FLOW DIRECTIONS
THIRD QUARTER 2014



CITY: SYRACUSE, NY; DIV: GROUP ENV; DBA: SANCHEZ; LDAS: PIC(00); PM(00); LVR(DR)ON(00)-OFF-REF-; G:\ENV\CAD\SYRACUSE\ACT\10001498114\COM\H\NY\180101.dwg; LAYOUT: 4; SAVER: 11/4/2014 10:19 AM; ACADVER: 18.18 (LMS TECH); PAGES: 2/11; PLOTTED: 11/4/2014 11:42 AM; BY: SANCHEZ, AIRMIN; XREFS: IMAGES; PROJECTNAME:



Notes:

VOC = Volatile organic compound.

lbs = Pounds.

TVOCs = Sum of VOCs detected.

Project VOCs = Sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes.

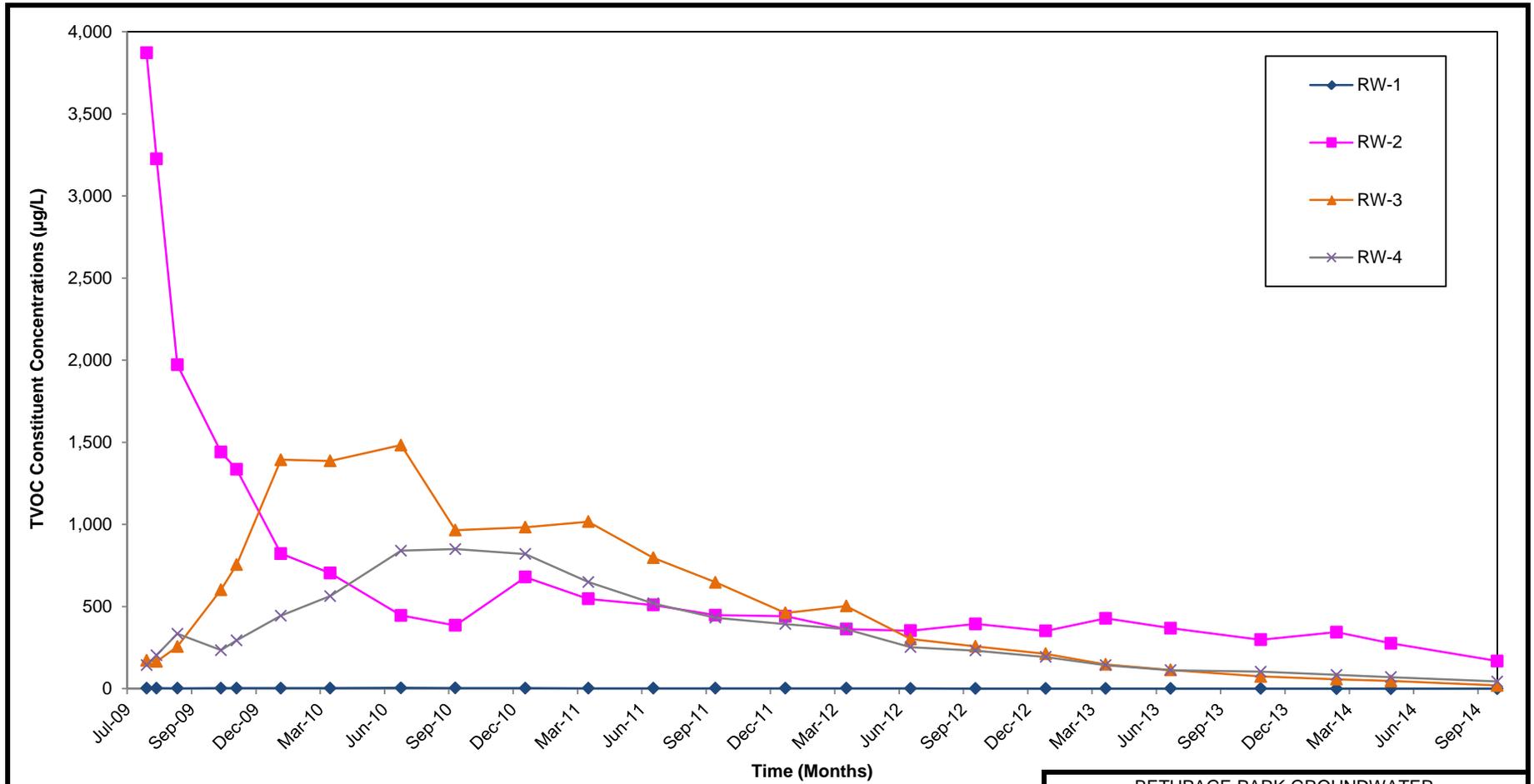
Non-Project VOCs = Sum of VOCs that are not Project VOCs.

BETHPAGE PARK GROUNDWATER
 CONTAINMENT SYSTEM, OPERABLE UNIT 3
 (FORMER GRUMMAN SETTLING PONDS)
 BETHPAGE, NEW YORK

**CUMULATIVE TOTAL, PROJECT,
 AND NON-PROJECT VOC MASS
 REMOVED THROUGH
 SEPTEMBER 2014**



FIGURE
5



Notes:

VOC = Volatile organic compound.

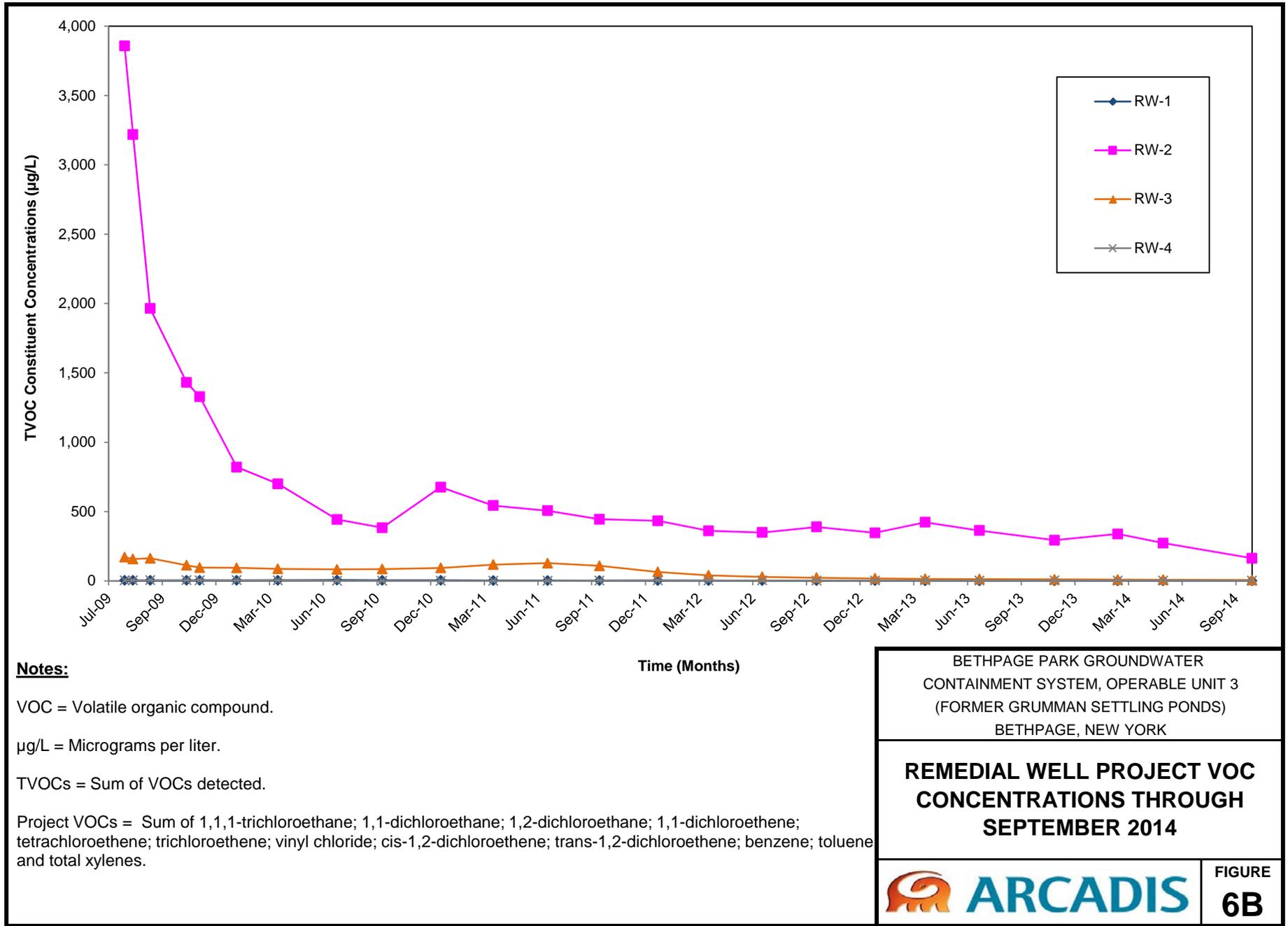
µg/L = Micrograms per liter.

TVOCs = Sum of VOCs detected.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

**REMEDIAL WELL TVOC
CONCENTRATIONS THROUGH
SEPTEMBER 2014**





Notes:

VOC = Volatile organic compound.

µg/L = Micrograms per liter.

TVOCs = Sum of VOCs detected.

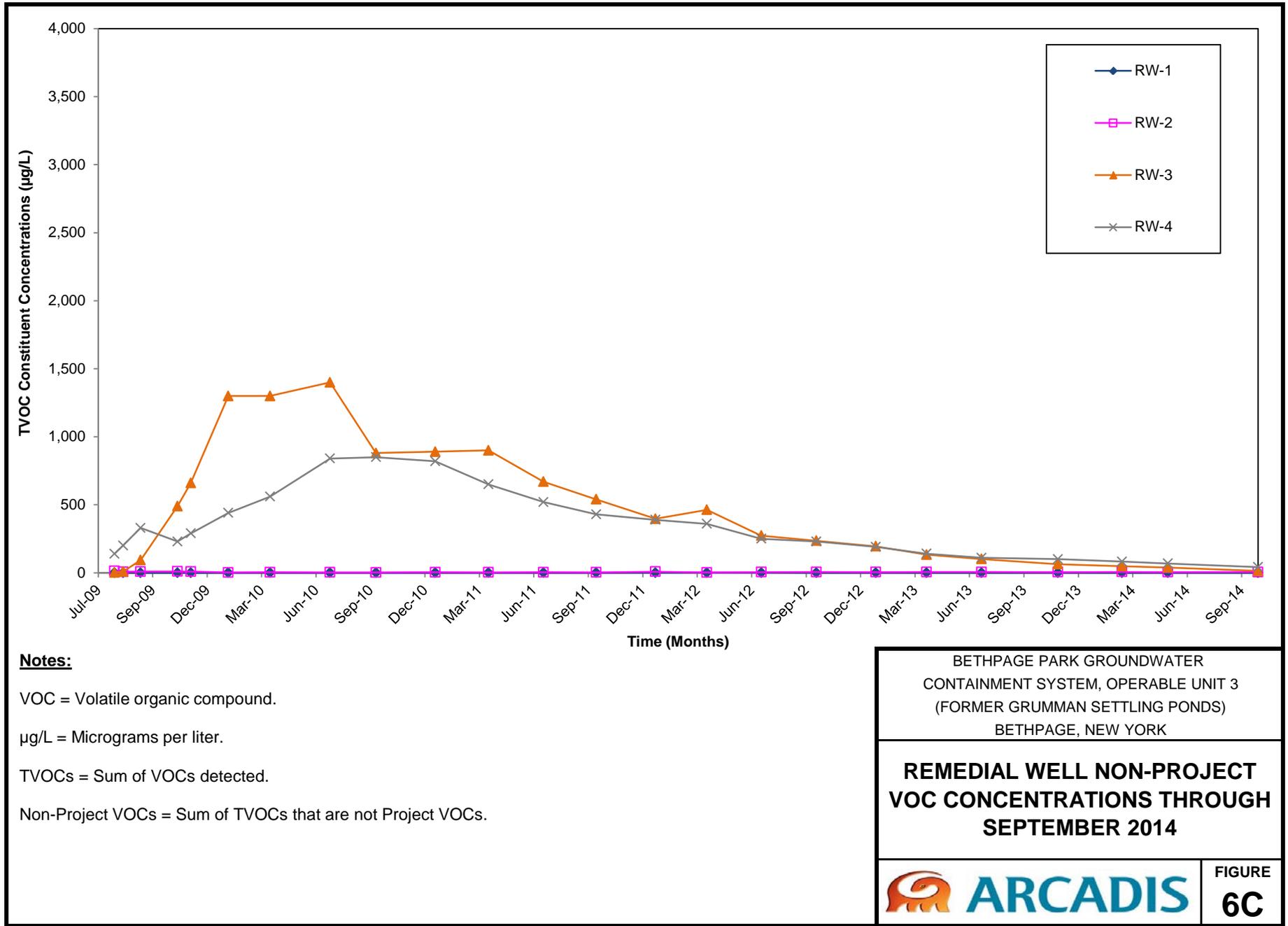
Project VOCs = Sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene and total xylenes.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

**REMEDIAL WELL PROJECT VOC
CONCENTRATIONS THROUGH
SEPTEMBER 2014**



**FIGURE
6B**



Notes:

VOC = Volatile organic compound.

µg/L = Micrograms per liter.

TVOCs = Sum of VOCs detected.

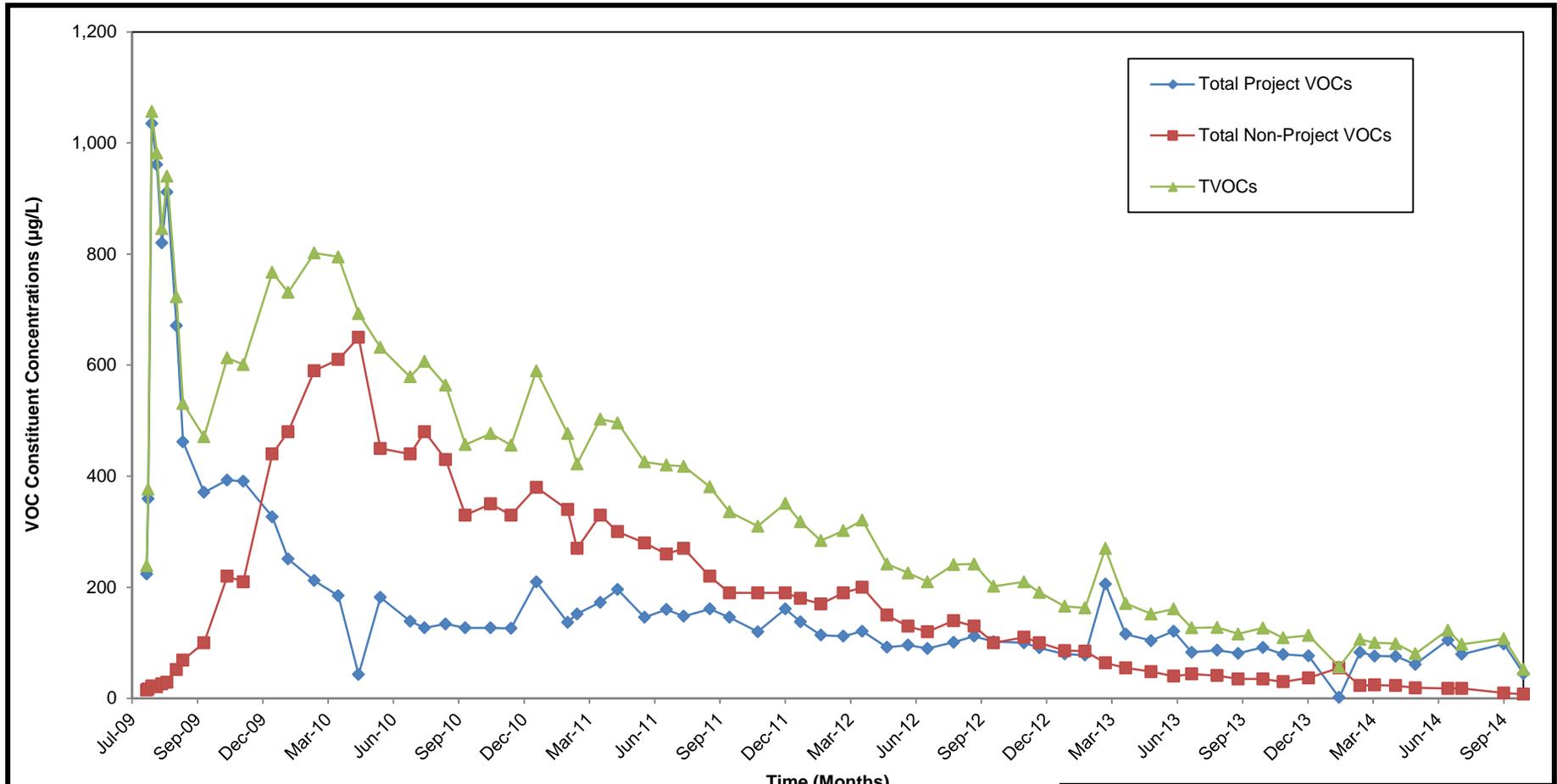
Non-Project VOCs = Sum of TVOCs that are not Project VOCs.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

**REMEDIAL WELL NON-PROJECT
VOC CONCENTRATIONS THROUGH
SEPTEMBER 2014**



FIGURE
6C



Notes:

VOC = Volatile organic compound.

µg/L = Micrograms per liter.

TVOCs = Sum of VOCs detected.

Project VOCs = Sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes.

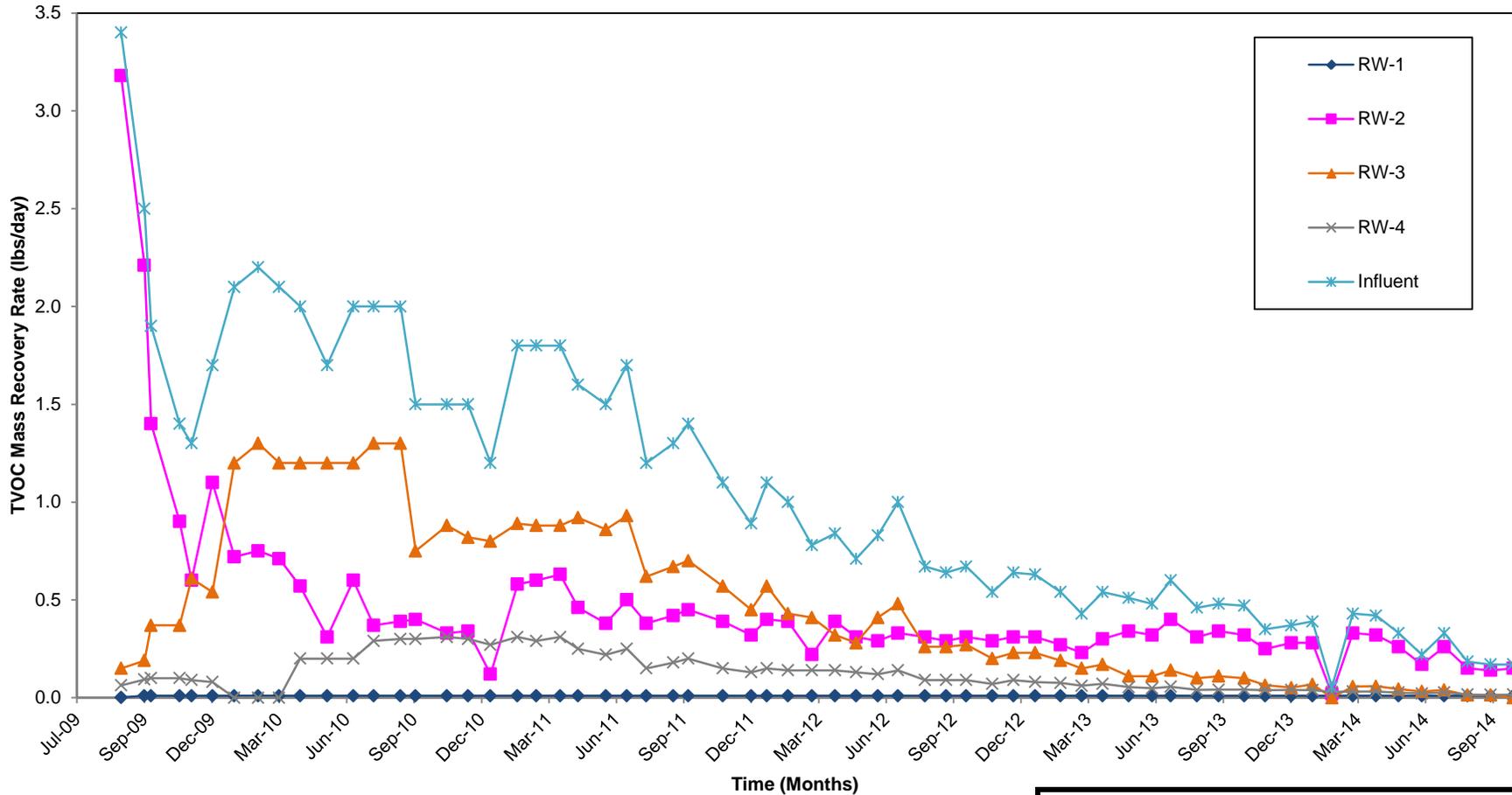
Non-Project VOCs = Sum of VOCs that are not Project VOCs.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

**INFLUENT TOTAL, PROJECT,
AND NON-PROJECT
VOC CONCENTRATIONS
THROUGH SEPTEMBER 2014**



**FIGURE
7**



Notes:

VOC = Volatile organic compound.

lbs/day = Pounds per day.

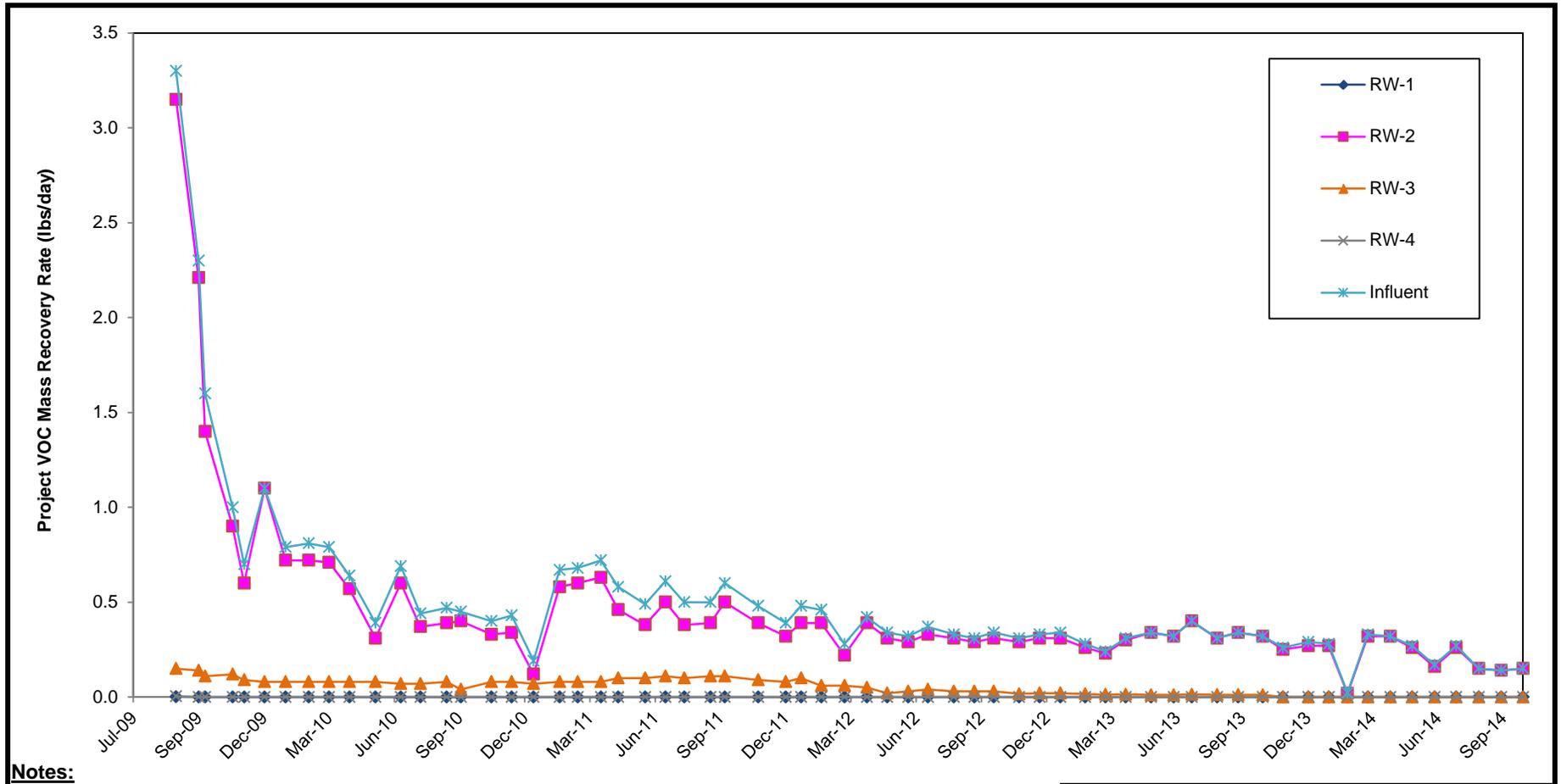
TVOCs = Sum of VOCs detected.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

**TVOC MASS RECOVERY RATES
THROUGH
SEPTEMBER 2014**



FIGURE
8A



Notes:

VOC = Volatile organic compound.

lbs/day = Pounds per day.

Project VOCs = Sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes

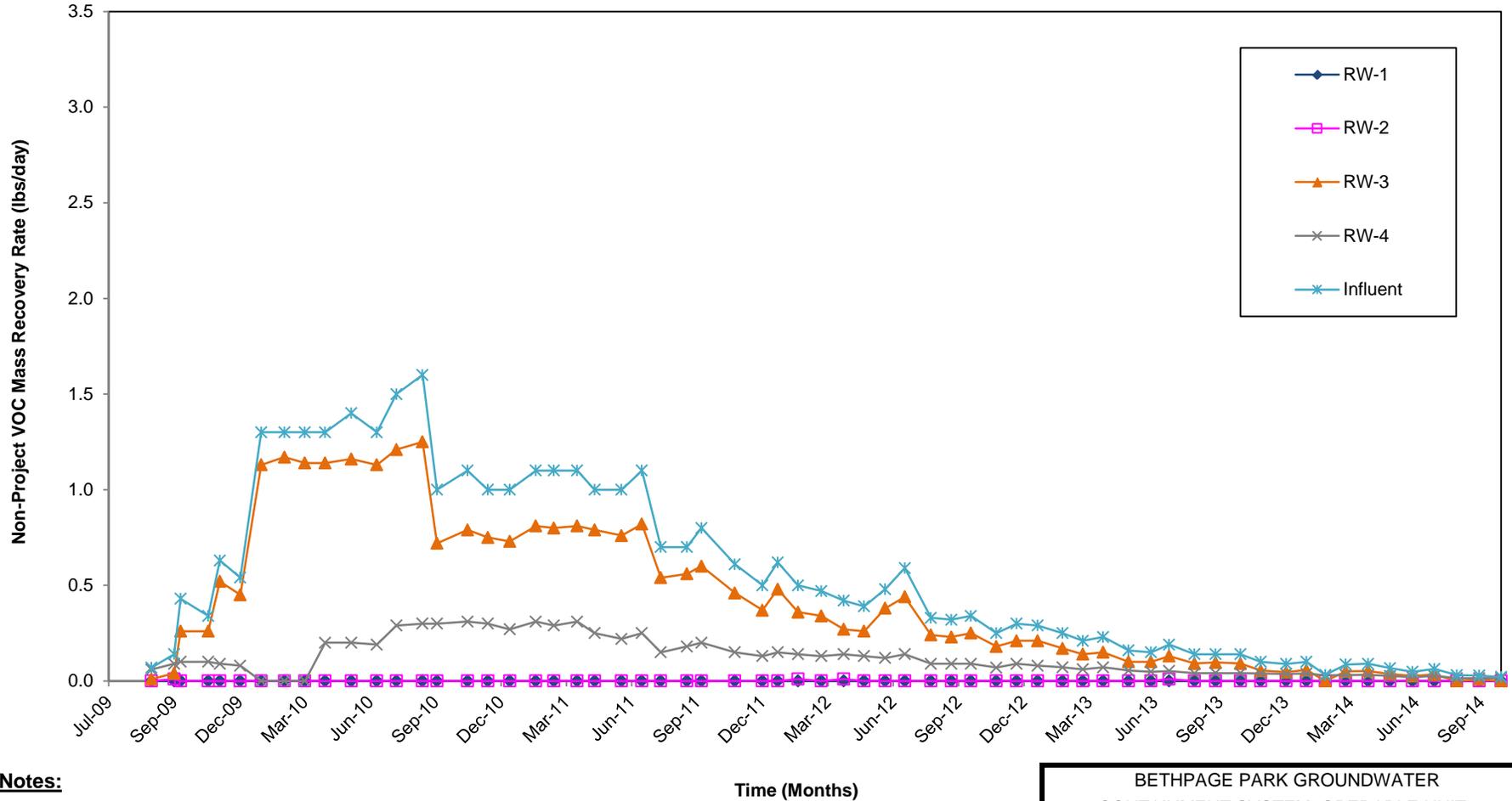
Time (Months)

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

**PROJECT VOC MASS RECOVERY
RATES THROUGH
SEPTEMBER 2014**



FIGURE
8B



Notes:

VOC = Volatile organic compound.

lbs/day = Pounds per day.

Non-Project VOCs = Sum of VOCs that are not Project VOCs.

BETHPAGE PARK GROUNDWATER
CONTAINMENT SYSTEM, OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

**NON-PROJECT VOC MASS
RECOVERY RATES THROUGH
SEPTEMBER 2014**



FIGURE
8C



Appendix A

Well Construction Information and
Environmental Effectiveness
Monitoring Program

Appendix A-1. Well Construction Information and Environmental Effectiveness Monitoring Program, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds Northrop Grumman Systems Corporation, Bethpage, New York. ^(1,2)

Well ID	Well Diameter (inches)	Depth to Screen		Screen Length (ft)	Well Depth (ft)	Well Materials	Water Levels ⁽³⁾	MONITORING ACTIVITY		
		Top (ft bls)	Bottom (ft bls)					VOC	WATER QUALITY ⁽⁴⁾	
Monitoring Wells										
BCPMW-1	2	50	65	15	65	Sch. 40 PVC	Quarterly	Baseline	Baseline	--
BCPMW-2	2	60	75	15	75	Sch. 40 PVC	Quarterly	Baseline	Baseline	Baseline
BCPMW-3	2	59	74	15	74	Sch. 40 PVC	Quarterly	Baseline	Baseline	Baseline
BCPMW-4-1	4	45	65	20	70	Sch. 40 PVC	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	Baseline
BCPMW-4-2	4	68.5	83.5	15	88.5	Sch. 40 PVC	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	Baseline
BCPMW-4-3	4	115	125	10	130	Sch. 40 PVC	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	Baseline
BCPMW-5-1	4	50	65	15	70	Sch. 80 PVC/ SS	Quarterly	Baseline	Baseline	Baseline
BCPMW-6-1	4	88.5	98.5	10	103.5	Sch. 40 PVC	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	--
BCPMW-6-2	4	133	143	10	148	Sch. 40 PVC	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	--
BCPMW-7-1	4	90	100	10	105	Sch. 40 PVC	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	--
B24MW-2	2	54	74	20	74	PVC	Quarterly	Baseline/Annual	Baseline	--
B24MW-3	2	55	70	15	70	PVC	Quarterly	Baseline/Annual	Baseline	--
B30MW-1	2	57	72	15	72	PVC	Quarterly	Baseline/Annual	Baseline	--
MW-200-1	4	85	95	10	100	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	--
MW-201-1	4	70	80	10	85	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	--
MW-202-1	4	125	135	10	140	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	--
MW-203-1	4	103	113	10	118	Sch. 40 PVC/ SS	Quarterly	Baseline/Semiannual ⁽⁵⁾	Baseline/Annual	--
Remedial Wells ⁽⁶⁾										
RW-01	8	108	128	20	134	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--
RW-02	6	84	104	20	104	Steel/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--
RW-03	8	84	104	20	107	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--
RW-04	8	110	130	20	133	Sch. 80 PVC/SS	Quarterly	Baseline/Quarterly	Baseline/Annual	--

See notes on last page.



Appendix B

Compliance and Performance
Program and Water Sample
Analytical Results

Appendix B-1. Compliance and Performance Program Elements, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Sample Location/Instrument ⁽¹⁾	Parameter (Method) ⁽²⁾	Frequency			SCADA Data Acquisition
		Short-Term ⁽³⁾ (first month)	(five month period following first month)	Long-Term ⁽⁴⁾	
<u>Water Samples</u> ⁽⁵⁾					
Remedial Well 1 (WSP-1)	VOCs (NYSDEC 2005 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010C)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010C) ⁽¹¹⁾	---	Annually	Annually	NA
Remedial Well 2 (WSP-2)	VOCs (NYSDEC 2005 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010C)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010C) ⁽¹¹⁾	---	Annually	Annually	NA
Remedial Well 3 (WSP-3)	VOCs (NYSDEC 2005 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010C)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010C) ⁽¹¹⁾	---	Annually	Annually	NA
Remedial Well 4 (WSP-4)	VOCs (NYSDEC 2005 OLM 4.3)	Bi-Weekly	Quarterly	Quarterly	NA
	Iron (USEPA 6010C)	Bi-Weekly	Annually	Annually	NA
	Cadmium and Chromium (USEPA 6010C) ⁽¹¹⁾	---	Annually	Annually	NA
Air Stripper Influent (WSP-5)	VOCs (NYSDEC 2005 OLM 4.3)	1-hr ⁽⁶⁾ ; Days 1, 3, & Weekly	Monthly	Quarterly	NA
	Iron (USEPA 6010C)	1-hr ⁽⁶⁾ ; Days 1, 3, & Weekly	Monthly	Quarterly	NA
Air Stripper Effluent (WSP-6)	Iron (USEPA 6010C)	1-hr ⁽⁶⁾ ; As Needed	As Needed	As Needed	NA
Plant Effluent (WSP-7)	VOCs (NYSDEC 2005 OLM 4.3)	1-hr ⁽⁶⁾; Days 1, 3, & Weekly	Monthly	Monthly	NA
	Iron (USEPA 6010C)	1-hr ⁽⁶⁾; Days 1, 3, & Weekly	Monthly	Monthly	NA
	Mercury (USEPA 7470A) ⁽⁷⁾	1-hr ⁽⁶⁾; Days 1, 3, & Weekly	Monthly	Monthly	NA
	pH (field) ⁽⁸⁾	1-hr ⁽⁶⁾; Days 1, 3, & Weekly	Monthly	Monthly	NA
	Cadmium and Chromium (USEPA 6010C) ⁽¹¹⁾	---	Quarterly	Quarterly	NA
<u>Air Samples</u> ⁽⁹⁾⁽¹⁰⁾					
Air Stripper Effluent/EKU-1 Influent (VSP-1)	VOCs (TO-15 Modified)	Monthly	Monthly	Quarterly	NA
EKU-1 Effluent/EKU-2 Influent (VSP-2)	VOCs (TO-15 Modified)	As Needed	As Needed	As Needed	NA
EKU-2 Effluent/EKU-3 Influent (VSP-3)	VOCs (TO-15 Modified)	As Needed	As Needed	As Needed	NA
EKU-3 Effluent/EKU-4 Influent (VSP-4)	VOCs (TO-15 Modified)	As Needed	As Needed	As Needed	NA
Total Effluent (VSP-5)	VOCs (TO-15 Modified)	Monthly	Monthly	Quarterly	NA

See notes on last page.

Appendix B-1. Compliance and Performance Program Elements, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Sample Location/Instrument ⁽¹⁾	Parameter (Method) ⁽²⁾	Frequency			
		Short-Term ⁽³⁾ (first month)	(five month period following first month)	Long-Term ⁽⁴⁾	SCADA Data Acquisition
<u>Water Flow Measurements</u>					
Remedial Well RW-1 (FT - 110)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-2 (FT - 120)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-3 (FT - 130)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-4 (FT - 140)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Combined Influent (FR - 200)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
System Effluent (FT-700)	Flow rate (gpm + total gal.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
<u>Air Flow Measurements</u>					
Air Stripper Effluent (FT-500)	Flow rate (SCFM)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
<u>Water Pressure Measurements</u>					
Remedial Well RW-1 (PT - 110)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-2 (PT - 120)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-3 (PT - 130)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Remedial Well RW-4 (PT - 140)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
Air Stripper Effluent (PT-700)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Weekly	Weekly	Continuously
<u>Air Temperature & Relatively Humidity Measurements</u>					
Air Stripper Effluent (TT-500)	Temperature	Weekly	Weekly	Weekly	Continuously
ECU Mid-Train (TI-503)	Temperature	Weekly	Weekly	Weekly	NA
Effluent (TI-603)	Temperature	Weekly	Weekly	Weekly	NA

See notes on last page.

Appendix B-1. Compliance and Performance Program Elements, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Sample Location/Instrument ⁽¹⁾	Parameter (Method) ⁽²⁾	Frequency			SCADA Data Acquisition
		Short-Term ⁽³⁾ (first month)	(five month period following first month)	Long-Term ⁽⁴⁾	
<u>Air Pressure Measurements</u>					
Air Stripper Effluent (PT-500)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	Continuously
ECU #1 Influent (PI-501)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
ECU #2 Influent (PI-502)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
ECU #3 Influent (PI-601)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
ECU #4 Influent (PI-602)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA
System Effluent (PI-603)	Pressure (i.w.g.)	(Daily -1st week) Weekly	Monthly	Quarterly	NA

See notes on last page.

Appendix B-1. Compliance and Performance Program Elements, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Northrop Grumman Systems Corporation, Bethpage, New York.

Notes:

- (1) Refer to Figure 3 of this Operation, Maintenance, & Monitoring (OM&M) Report and Appendix E of the Groundwater IRM OM&M Manual (OM&M Manual (ARCADIS 2009)) for a diagram showing referenced sample locations and measurement points.
- (2) Parameters/methods may be modified based on review of short-term and/or long-term testing results. Parameters shown in **Bold** indicate parameters that require NYSDEC notification/approval prior to change in monitoring schedule.
- (3) Short-term schedule is tentative. Modification may be required/recommended based on the results of start-up and performance testing.
- (4) Long-term schedule is tentative. Modification may be required/recommended based on the results of short-term testing or water quality trends.
- (5) Water samples will be collected in accordance with the methods described in the Sampling and Analysis Plan, which is included as Appendix A of the OM&M Manual (ARCADIS 2009). Samples will be analyzed in accordance with the methods and procedures described in the Sampling and Analysis Plan.
- (6) Per NYSDEC request, a 1-hr pilot test was performed during system shake-down. The 1-hr pilot test samples were also analyzed for Mercury (Hg).
- (7) Per the interim treated effluent (water) discharge criteria provided in the NYSDEC letter dated March 19, 2009, select samples were analyzed for Mercury (Hg).
- (8) As authorized by the NYSDEC, the pH monitoring frequency was reduced from weekly to monthly beginning on February 8, 2010.
- (9) Air samples collected and analyzed in accordance with methods described in the Sampling and Analysis Plan, which is included as Appendix A of the OM&M Manual (ARCADIS 2009).
- (10) Additional air samples will be collected to help calculate media usage rates and to help determine media changeout frequencies.
- (11) Cadmium and Chromium analyses are part of the Environmental Effectiveness Monitoring Program (Table A-1) and the original discharge permit application. They are included here for consistency.

Acronyms\Key:

NA	Not Applicable.
---	Not Required
ECU	Emissions control unit.
VOCs	Volatile organic compounds (refer Tables D-3 and D-5 in the Quality Assurance Project Plan (QAPP) (Appendix D of the OM&M Manual (ARCADIS 2009)) for the analyte lists for aqueous and air samples, respectively).
gal.	Gallons.
gpm	Gallons per minute.
i.w.g.	Inches water gauge.
NYSDEC	New York State Department of Environmental Conservation.
EPA	U.S. Environmental Protection Agency.
SCADA	Supervisory Control And Data Acquisition.
OM&M	Operation, maintenance and monitoring.

Appendix B-2. Water Sample Analytical Results - July 8, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3
 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2,3)

COMPOUND (ug/L)	Sample ID:	WSP-05	WSP-07
	Sample Location:	Influent	Effluent
	Sample Date:	7/8/2014	7/8/2014
<u>Volatile Organic Compounds</u>			
1,1,1-Trichloroethane		< 5.0 U	< 5.0 U
1,1,1,2-Tetrachloroethane		< 5.0 U	< 5.0 U
1,1,2-Trichloroethane		< 5.0 U	< 5.0 U
1,1-Dichloroethane		0.42 J	< 5.0 U
1,1-Dichloroethene		< 5.0 U	< 5.0 U
1,2-Dichloroethane		< 5.0 U	< 5.0 U
1,2-Dichloropropane		< 5.0 U	< 5.0 U
2-Butanone		< 50 U	< 50 U
4-Methyl-2-Pentanone		< 50 U	< 50 U
Acetone		< 50 U	< 50 U
Benzene		< 0.70 U	< 0.70 U
Bromodichloromethane		< 5.0 U	< 5.0 U
Bromoform		< 5.0 U	< 5.0 U
Bromomethane		< 5.0 U	< 5.0 U
Carbon Disulfide		< 5.0 U	< 5.0 U
Carbon Tetrachloride		< 5.0 U	< 5.0 U
Chlorobenzene		< 5.0 U	< 5.0 U
Chlorodibromomethane		< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)		18	< 5.0 U
Chloroethane		< 5.0 U	< 5.0 U
Chloroform		1.7 J	< 5.0 U
Chloromethane		< 5.0 U	< 5.0 U
cis-1,2-Dichloroethene		25	< 5.0 U
cis-1,3-Dichloropropene		< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)		< 5.0 U	< 5.0 U
Dichloromethane		< 5.0 U	< 5.0 U
Ethylbenzene		1.1 J	< 5.0 U
Methyl N-Butyl Ketone		< 50 U	< 50 U
Methyl-Tert-Butylether		< 5.0 U	< 5.0 U
Styrene (Monomer)		< 5.0 U	< 5.0 U
Tetrachloroethene		0.30 J	< 5.0 U
Toluene		22	< 5.0 U
trans-1,2-Dichloroethene		< 5.0 U	< 5.0 U
trans-1,3-Dichloropropene		< 5.0 U	< 5.0 U
Trichloroethene		5.1	< 5.0 U
Trichlorofluoromethane (Freon 11)		< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)		< 5.0 U	< 5.0 U
Vinyl Chloride		24	< 2.0 U
Xylene-o		0.85 J	< 5.0 U
Xylenes - m,p		1.7 J	< 5.0 U
Tentatively Identified Compounds		ND	ND
Total VOCs ⁽⁴⁾		100	ND

See notes on last page.

Appendix B-2. Water Sample Analytical Results - July 8, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3
(Former Grumman Settling Ponds), Bethpage, New York. ^(1,2,3)

	Sample ID:	WSP-05	WSP-07
COMPOUND	Sample Location:	Influent	Effluent
(ug/L)	Sample Date:	7/8/2014	7/8/2014

Metals

Cadmium (Dissolved)	--	--
Cadmium (Total)	--	--
Chromium (Dissolved)	--	--
Chromium (Total)	--	--
Iron (Dissolved)	420	470
Iron (Total)	19,500	580
Manganese (Dissolved)	--	--
Manganese (Total)	--	--
Mercury (Dissolved)	--	--
Mercury (Total)	--	< 0.20 U

Notes:

- (1) Water samples collected by ARCADIS on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3 (prior to September 1, 2014) and per USEPA Method 8260C (after September 1, 2014), for iron analyses per USEPA Method 6010C and for mercury analyses per USEPA Method 7470A.
- (2) Refer to Figure 3 of this OM&M Report for schematic sample locations.
- (3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009).
- (4) "Total VOCs" represents the sum of individual concentrations of VOCs detected. Values shown have been rounded to the nearest whole number.

Acronyms\Key:

Bold value indicates a detection.

ELAP	Environmental Laboratory Approval Program
J	Estimated value.
ND	Not Detected
NYSDOH	New York State Department of Health
OM&M	Operation, maintenance and monitoring.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/L	Micrograms per liter.
--	Not analyzed.
< 5 U	Compound not detected above its laboratory quantification limit.

Appendix B-3. Water Sample Analytical Results - September 4, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3
 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2,3)

COMPOUND (ug/L)	Sample ID: Sample Location: Sample Date:	WSP-05 ⁽⁵⁾ Influent ⁽⁵⁾ 9/4/2014	WSP-05 Dup. ⁽⁵⁾ Influent ⁽⁵⁾ 9/4/2014	WSP-07 ⁽⁵⁾ Effluent ⁽⁵⁾ 9/4/2014
<u>Volatile Organic Compounds</u>				
1,1,1-Trichloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,1,2,2-Tetrachloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,1,2-Trichloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,1-Dichloroethane		0.59 J	0.61 J	< 5.0 U
1,1-Dichloroethene		< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloroethane		< 5.0 U	< 5.0 U	< 5.0 U
1,2-Dichloropropane		< 5.0 U	< 5.0 U	< 5.0 U
2-Butanone		< 50 U	< 50 U	< 50 U
4-Methyl-2-Pentanone		< 50 U	< 50 U	< 50 U
Acetone		< 50 U	< 50 U	< 50 U
Benzene		< 0.70 U	< 0.70 U	< 0.70 U
Bromodichloromethane		< 5.0 U	< 5.0 U	< 5.0 U
Bromoform		< 5.0 U	< 5.0 U	< 5.0 U
Bromomethane		< 5.0 U	< 5.0 U	< 5.0 UB
Carbon Disulfide		< 5.0 U	< 5.0 U	< 5.0 U
Carbon Tetrachloride		< 5.0 U	< 5.0 U	< 5.0 U
Chlorobenzene		< 5.0 U	< 5.0 U	< 5.0 U
Chlorodibromomethane		< 5.0 U	< 5.0 U	< 5.0 U
Chlorodifluoromethane (Freon 22)		9.7	9.6	< 5.0 U
Chloroethane		< 5.0 U	< 5.0 U	< 5.0 U
Chloroform		1.2 J	1.1 J	< 5.0 U
Chloromethane		< 5.0 U	< 5.0 U	< 5.0 U
cis-1,2-Dichloroethene		28	28	< 5.0 U
cis-1,3-Dichloropropene		< 5.0 U	< 5.0 U	< 5.0 U
Dichlorodifluoromethane (Freon 12)		< 5.0 U	< 5.0 U	< 5.0 U
Dichloromethane		< 5.0 U	< 5.0 U	< 5.0 U
Ethylbenzene		1.8 J	1.8 J	< 5.0 U
Methyl N-Butyl Ketone		< 50 U	< 50 U	< 50 U
Methyl-Tert-Butylether		< 5.0 U	< 5.0 U	< 5.0 U
Styrene (Monomer)		< 5.0 U	< 5.0 U	< 5.0 U
Tetrachloroethene		0.31 J	< 5.0 U	< 5.0 U
Toluene		29	28	< 5.0 U
trans-1,2-Dichloroethene		< 5.0 U	< 5.0 U	< 5.0 U
trans-1,3-Dichloropropene		< 5.0 U	< 5.0 U	< 5.0 U
Trichloroethene		7.1	6.7	< 5.0 U
Trichlorofluoromethane (Freon 11)		< 5.0 U	< 5.0 U	< 5.0 U
Trichlorotrifluoroethane (Freon 113)		< 5.0 U	< 5.0 U	< 5.0 U
Vinyl Chloride		30	32	< 2.0 U
Xylene-o		1.3 J	1.3 J	< 5.0 U
Xylenes - m,p		1.9 J	2.0 J	< 5.0 U
Tentatively Identified Compounds		ND	ND	ND
Total VOCs ⁽⁴⁾		111	111	ND

See notes on last page.

Appendix B-3. Water Sample Analytical Results - September 4, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2,3)

COMPOUND (ug/L)	Sample ID: Sample Location: Sample Date:	WSP-05 ⁽⁵⁾ Influent ⁽⁵⁾ 9/4/2014	WSP-05 Dup. ⁽⁵⁾ Influent ⁽⁵⁾ 9/4/2014	WSP-07 ⁽⁵⁾ Effluent ⁽⁵⁾ 9/4/2014
Metals				
Cadmium (Dissolved)		--	--	--
Cadmium (Total)		--	--	--
Chromium (Dissolved)		--	--	--
Chromium (Total)		--	--	--
Iron (Dissolved)		780	--	580
Iron (Total)		1,820	--	1,000
Manganese (Dissolved)		--	--	--
Manganese (Total)		--	--	--
Mercury (Dissolved)		--	--	--
Mercury (Total)		--	--	< 0.20 U

Notes:

- (1) Water samples collected by ARCADIS on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3 (prior to September 1, 2014) and per USEPA Method 8260C (after September 1, 2014), for iron analyses per USEPA Method 6010C and for mercury analyses per USEPA Method 7470A.
- (2) Refer to Figure 3 of this OM&M Report for schematic sample locations.
- (3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009).
- (4) "Total VOCs" represents the sum of individual concentrations of VOCs detected. Values shown have been rounded to the nearest whole number.
- (5) The August 2014 monthly sample from WSP-5 was collected on September 4, 2014 due to system maintenance activities throughout August.

Acronyms\Key:

Bold value indicates a detection.

dup.	Duplicate.
ELAP	Environmental Laboratory Approval Program
J	Estimated value.
ND	Not Detected
NYSDOH	New York State Department of Health
OM&M	Operation, maintenance and monitoring.
UB	Compound considered non-detect due to associated blank contamination.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/L	Micrograms per liter.
--	Not analyzed.
< 5 U	Compound not detected above its laboratory quantification limit.

Appendix B-4. Water Sample Analytical Results - October 1, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2,3)

COMPOUND (ug/L)	Sample ID: Sample Location: Sample Date:	WSP-01 ⁽⁵⁾ RW-1 ^(b) 10/1/2014	WSP-02 ⁽⁵⁾ RW-2 ^(b) 10/1/2014	WSP-03 ⁽⁵⁾ RW-3 ^(b) 10/1/2014	WSP-04 ⁽⁵⁾ RW-4 ^(b) 10/1/2014	WSP-05 ⁽⁵⁾ Influent ^(b) 10/1/2014	WSP-07 ⁽⁵⁾ Effluent ^(b) 10/1/2014
Volatile Organic Compounds							
1,1,1-Trichloroethane		< 5.0 U	< 5.0 U				
1,1,2,2-Tetrachloroethane		< 5.0 U	< 5.0 U				
1,1,2-Trichloroethane		< 5.0 U	< 5.0 U				
1,1-Dichloroethane		< 5.0 U	0.85 J	< 5.0 U	0.36 J	0.27 J	< 5.0 U
1,1-Dichloroethene		< 5.0 U	< 5.0 U				
1,2-Dichloroethane		< 5.0 U	< 5.0 U				
1,2-Dichloropropane		< 5.0 U	< 5.0 U				
2-Butanone		< 5.0 U	< 5.0 U				
4-Methyl-2-Pentanone		< 5.0 U	< 5.0 U				
Acetone		< 5.0 U	1.4 J				
Benzene		< 0.70 U	< 0.70 U				
Bromodichloromethane		< 5.0 U	< 5.0 U				
Bromoform		< 5.0 U	< 5.0 U				
Bromomethane		< 5.0 U	< 5.0 U				
Carbon Disulfide		< 5.0 U	< 5.0 U				
Carbon Tetrachloride		< 5.0 U	< 5.0 U				
Chlorobenzene		< 5.0 U	< 5.0 U				
Chlorodibromomethane		< 5.0 U	< 5.0 U				
Chlorodifluoromethane (Freon 22)		< 5.0 U	< 5.0 U	9.0	42	7.5	< 5.0 U
Chloroethane		< 5.0 U	< 5.0 U				
Chloroform		< 5.0 U	2.8 J	4.8 J	0.37 J	2.0 J	< 5.0 U
Chloromethane		< 5.0 U	< 5.0 U				
cis-1,2-Dichloroethene		< 5.0 U	51	2.8 J	< 5.0 U	13	< 5.0 U
cis-1,3-Dichloropropene		< 5.0 U	< 5.0 U				
Dichlorodifluoromethane (Freon 12)		< 5.0 U	< 5.0 U				
Dichloromethane		< 5.0 U	< 5.0 U				
Ethylbenzene		< 5.0 U	2.9 J	< 5.0 U	< 5.0 U	0.84 J	< 5.0 U
Methyl N-Butyl Ketone		< 5.0 U	< 5.0 U				
Methyl-Tert-Butylether		< 5.0 U	< 5.0 U				
Styrene (Monomer)		< 5.0 U	< 5.0 U				
Tetrachloroethene		< 5.0 U	< 5.0 U	< 5.0 U	0.74 J	< 5.0 U	< 5.0 U
Toluene		< 5.0 U	46	0.35 J	< 5.0 U	13	< 5.0 U
trans-1,2-Dichloroethene		< 5.0 U	< 5.0 U				
trans-1,3-Dichloropropene		< 5.0 U	< 5.0 U				
Trichloroethene		0.34 J	12	2.6 J	0.61 J	4.0 J	< 5.0 U
Trichlorofluoromethane (Freon 11)		< 5.0 U	< 5.0 U				
Trichlorotrifluoroethane (Freon 113)		< 5.0 U	< 5.0 U				
Vinyl Chloride		< 2.0 U	48	< 2.0 U	< 2.0 U	13	< 2.0 U
Xylene-o		< 5.0 U	2.0 J	< 5.0 U	< 5.0 U	0.60 J	< 5.0 U
Xylenes - m,p		< 5.0 U	3.1 J	< 5.0 U	< 5.0 U	0.93 J	< 5.0 U
Tentatively Identified Compounds		ND	ND	ND	ND	ND	ND
Total VOCs ⁽⁴⁾		0.34	169	20	44	55	1.4

See notes on last page.

Appendix B-4. Water Sample Analytical Results - October 1, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3
 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2,3)

COMPOUND (ug/L)	Sample ID: Sample Location: Sample Date:	WSP-01 ⁽⁵⁾ RW-1 ^(b) 10/1/2014	WSP-02 ⁽⁵⁾ RW-2 ^(b) 10/1/2014	WSP-03 ⁽⁵⁾ RW-3 ^(b) 10/1/2014	WSP-04 ⁽⁵⁾ RW-4 ^(b) 10/1/2014	WSP-05 ⁽⁵⁾ Influent ^(b) 10/1/2014	WSP-07 ⁽⁵⁾ Effluent ^(b) 10/1/2014
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Metals

Cadmium (Dissolved)	--	--	--	--	--	--	< 5.0 U
Cadmium (Total)	--	--	--	--	--	--	< 5.0 U
Chromium (Dissolved)	--	--	--	--	--	--	< 10 U
Chromium (Total)	--	--	--	--	--	--	< 10 U
Iron (Dissolved)	--	1,200	< 100 U	--	--	340	330
Iron (Total)	--	2,060	350	--	--	1,040	470
Manganese (Dissolved)	--	--	--	--	--	--	--
Manganese (Total)	--	--	--	--	--	--	--
Mercury (Dissolved)	--	--	--	--	--	--	--
Mercury (Total)	--	--	--	--	--	--	< 0.20 U

Notes:

- (1) Water samples collected by ARCADIS on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3 (prior to September 1, 2014) and per USEPA Method 8260C (after September 1, 2014), for iron analyses per USEPA Method 6010C and for mercury analyses per USEPA Method 7470A.
- (2) Refer to Figure 3 of this OM&M Report for schematic sample locations.
- (3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M Manual (ARCADIS 2009).
- (4) "Total VOCs" represents the sum of individual concentrations of VOCs detected. Values shown have been rounded to the nearest whole number.
- (5) The September 2014 monthly sample from WSP-5 was collected on October 1, 2014 due to system maintenance activities throughout September.

Acronyms\Key:
Bold value indicates a detection.

ELAP	Environmental Laboratory Approval Program
J	Estimated value.
ND	Not Detected
NYSDOH	New York State Department of Health
OM&M	Operation, maintenance and monitoring.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/L	Micrograms per liter.
--	Not analyzed.
< 5 U	Compound not detected above its laboratory quantification limit.



Appendix C

Vapor Sample Analytical Results

Appendix C-1. Vapor Sample Analytical Results - October 1, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3
 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2,3)

COMPOUND (ug/m ³)	Location ID: Sample Location: Sample Date:	VSP-1 ⁽⁵⁾ Influent ⁽⁵⁾ 10/1/2014	VSP-2 ⁽⁵⁾ GAC Mid-Train ⁽⁵⁾ 10/1/2014	VSP-3 ⁽⁵⁾ Midfluent ⁽⁵⁾ 10/1/2014	VSP-4 ⁽⁵⁾ PPZ Mid-Train ⁽⁵⁾ 10/1/2014	VSP-5 ⁽⁵⁾ Effluent ⁽⁵⁾ 10/1/2014
<u>Volatile Organic Compounds</u>						
1,1,1-Trichloroethane		0.83	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
1,1,2,2-Tetrachloroethane		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
1,1,2-Trichloroethane		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
1,1-Dichloroethane		4.9	7.1	7.1	7.7	5.7
1,1-Dichloroethene		1.6	2.2	3.5	3.1	1.6
1,2-Dichloroethane		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
1,2-Dichloropropane		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
1,3-Butadiene		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
1-Chloro-1,1-difluoroethane		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
2-Butanone		< 7.1 U	76	< 7.4 U	< 13 U	< 9.4 U
4-Methyl-2-Pentanone		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Acetone		< 7.1 U	1,800 D	62	< 13 U	< 9.4 U
Benzene		< 0.71 U	27	< 0.74 U	2.0	< 0.94 U
Bromodichloromethane		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Bromoform		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Bromomethane		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Carbon Disulfide		< 7.1 U	< 14 U	< 7.4 U	< 13 U	< 9.4 U
Carbon Tetrachloride		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Chlorobenzene		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Chlorodibromomethane		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Chlorodifluoromethane (Freon 22)		61	63	56	74	29
Chloroethane		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Chloroform		30	30	24	27	20
Chloromethane		< 0.71 U	2.1	< 0.74 U	< 1.3 U	< 0.94 U
cis-1,2-Dichloroethene		240 D	540 D	510 D	390 D	140
cis-1,3-Dichloropropene		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Dichlorodifluoromethane (Freon 12)		2.4	2.2	2.2	2.4	2.3
Dichloromethane		0.79	< 1.4 U	< 0.74 U	< 1.3 U	2.2
Ethylbenzene		15	< 1.4 U	0.80	1.5	0.99
Methyl N-Butyl Ketone		< 0.71 U	9.9	< 0.74 U	< 1.3 U	< 0.94 U
Methyl tert-Butyl Ether		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Styrene		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	2.7
Tetrachloroethene		2.9	3.7	< 0.74 U	< 1.3 U	< 0.94 U
Toluene		240 D	< 1.4 U	11	24	20
trans-1,2-Dichloroethene		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
trans-1,3-Dichloropropene		< 0.71 U	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Trichloroethene		59	< 1.4 U	3.2	5.1	2.3
Trichlorofluoromethane (Freon 11)		1.4	< 1.4 U	1.5	1.6	1.8
Trichlorotrifluoroethane (Freon 113)		1.7	2.6	1.9	2.1	1.8
Vinyl Chloride		250 D	240	250 D	180	55
Xylene - o		9.8	< 1.4 U	< 0.74 U	< 1.3 U	< 0.94 U
Xylenes - m,p		15	< 2.9 U	< 1.5 U	< 2.6 U	< 1.9 U
Total VOCs		936	2,806	933	721	285

See notes on last page.

Appendix C-1. Vapor Sample Analytical Results - October 1, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3
 (Former Grumman Settling Ponds), Bethpage, New York. ^(1,2,3)

COMPOUND (ug/m ³)	Location ID: Sample Location: Sample Date:	VSP-1 ⁽⁵⁾ Influent ⁽⁵⁾ 10/1/2014	VSP-2 ⁽⁵⁾ GAC Mid-Train ⁽⁵⁾ 10/1/2014	VSP-3 ⁽⁵⁾ Midfluent ⁽⁵⁾ 10/1/2014	VSP-4 ⁽⁵⁾ PPZ Mid-Train ⁽⁵⁾ 10/1/2014	VSP-5 ⁽⁵⁾ Effluent ⁽⁵⁾ 10/1/2014
<u>Tentatively Identified Compounds</u>						
2-Methyl-3-buten-2-ol	--	--	--	--	--	7.3 JN
2-Methyldecane	--	440 JN	40 JN	--	--	--
2-Methylpyridine	--	--	--	--	--	4.3 JN
2-Methylundecane	--	1,400 JN	130 JN	19 JN	--	--
2,6-Dimethylpyridine	--	--	--	--	--	6.4 JN
2,6-Dimethylundecane	--	710 JN	78 JN	13 JN	--	--
3-Methyldecane	--	--	--	5.7 JN	--	--
3-Methylundecane	--	960 JN	95 JN	15 JN	--	--
3,7-Dimethyldecane	--	790 JN	83 JN	--	--	--
4-Methylundecane	--	790 JN	73 JN	11 JN	--	--
5,6-Dipropyldecane	--	--	--	--	--	4.3 JN
Acetonitrile	--	--	--	--	--	26 JN
Acetophenone	--	380 JN	--	--	--	--
alpha-Cumyl Alcohol	--	2,600 JN	77 JN	--	--	22 JN
Benzothiazole	--	--	--	--	--	6.2 JN
C ₉ H ₁₈ Compound	--	--	46 JN	--	--	--
C ₁₁ H ₂₀ Compound	--	--	36 JN	--	--	--
C ₁₂ H ₂₆ Branched Alkane	--	1,500 JN	150 JN	16 JN	--	--
C ₁₂ H ₂₆ Branched Alkane	--	1,200 JN	130 JN	13 JN	--	--
C ₁₂ H ₂₆ Branched Alkane	--	--	--	9.9 JN	--	--
C ₁₃ H ₂₆ Branched Compound	--	330 JN	--	6.8 JN	--	--
C ₁₃ H ₂₈ Branched Alkane	--	--	--	--	--	--
Decahydronaphthalene Isomer	--	1,900 JN	190 JN	17 JN	--	--
Decahydronaphthalene Isomer	--	2,200 JN	220 JN	27 JN	--	--
Decahydronaphthalene Isomer	--	--	61 JN	--	--	--
Decahydronaphthalene Isomer	--	--	90 JN	--	--	--
Decahydronaphthalene Isomer	--	--	67 JN	--	--	--
Dimethylsilanediol	--	--	--	--	--	13 JN
Hexamethylcyclotrisiloxane	--	--	--	--	--	32 JN
Isobutene	--	--	--	--	--	7.1 JN
Methoxyphenyloxime	--	--	--	--	--	4.9 JN
Methylcyclohexane	4.7 JN	--	--	--	--	--
N-Undecane	--	920 JN	80 JN	7.5 JN	--	--
Pentylcyclohexane	--	710 JN	56 JN	--	--	--
tert-Butanol	--	--	--	--	--	4.5 JN
Trimethylsilanol	3.7 JN	--	--	--	--	26 JN
Unidentified Compound	--	470 JN	120 JN	10 JN	--	28 JN
Unidentified Compound	--	1,100 JN	120 JN	11 JN	--	--
Unidentified Compound	--	640 JN	--	21 JN	--	--
Unidentified Compound	--	1,400 JN	--	5.5 JN	--	--
Unidentified Compound	--	340 JN	--	--	--	--
Unidentified Siloxane	--	--	--	--	--	14 JN

See notes on last page.

Appendix C-1. Vapor Sample Analytical Results - October 1, 2014, Bethpage Park Groundwater Containment System, Operable Unit 3
(Former Grumman Settling Ponds), Bethpage, New York. ^(1,2,3)

Notes:

- (1) Vapor samples collected by ARCADIS on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15.
- (2) Refer to Figure 3 of this OM&M Report for schematic sample locations.
- (3) Results validated following protocols specified in the Sampling and Analysis Plan (Appendix A) of the Groundwater OM&M (ARCADIS 2009).
- (4) "Total VOCs" represents the sum of individual concentrations of VOCs detected. Values shown have been rounded to the nearest whole number.
- (5) The September 2014 quarterly samples were collected on October 1, 2014 due to system maintenance activities throughout September.

Acronyms\Key:

Bold value indicates a detection.

D	Concentration is based on a diluted sample analysis.
ELAP	Environmental Laboratory Approval Program.
JN	Compound tentatively identified, concentration is estimated.
OM&M	Operation, maintenance and monitoring.
NYSDEC	New York State Department of Environmental Conservation.
NYSDOH	New York State Department of Health.
TIC	Tentatively identified compound.
USEPA	United States Environmental Protection Agency.
VOC	Volatile organic compound.
ug/m ³	Micrograms per cubic meter.
< 1.5 U	Compound not detected above its laboratory quantification limit.
--	TIC not detected.



Appendix D

Air Discharge Quality Evaluation

Appendix D-1. Annual Summary of SCREEN3 Model Input and Outputs, Bethpage Park Groundwater Containment System, Operable Unit 3
(Former Grumman Settling Ponds), Bethpage, New York.

Parameters	Date Sampled:	11/14/13	3/10/14 ⁽¹⁰⁾	05/05/14	10/01/14 ⁽¹¹⁾
SCREEN3 Model Input					
Source Type		Point	Point	Point	Point
Emission Rate (g/s)		1	1	1	1
Stack Height (ft)		13.5	13.5	13.5	13.5
Stack Height (m)		4.1	4.1	4.1	4.1
Stack Inside Diameter (m)		0.36	0.36	0.36	0.36
Air Flow Rate (scfm) ^(1,9)		1,970	1,974	1,963	1,900
Air Flow Rate (acfm @ stack temp) ⁽²⁾		1,969	1,976	1,995	1,870
Stack Gas Exit Temperature (K) ⁽¹⁾		294	295	299	290
Ambient Air Temperature (K) ⁽³⁾		281	276	286	289
Receptor Height (m) ⁽⁴⁾		1.5	1.5	1.5	1.5
Urban/Rural		Urban	Urban	Urban	Urban
Building Height (m)		2.6	2.6	2.6	2.6
Min Horizontal Bldg Dim (m)		7.9	7.9	7.9	7.9
Max Horizontal Bldg Dim (m)		9.8	9.8	9.8	9.8
Consider Bldg Downwash?		Yes	Yes	Yes	Yes
Simple/Complex Terrain Above Stack		Simple	Simple	Simple	Simple
Simple/Complex Terrain Above Stack Base		Simple	Simple	Simple	Simple
Meteorology		Full	Full	Full	Full
Automated Distances Array		Yes	Yes	Yes	Yes
Terrain Height Above Stack Base		0	0	0	0
SCREEN3 Model Output					
1-HR Max Concentration at Receptor Height ($\mu\text{g}/\text{m}^3$) ⁽⁵⁾		2,067	2,066	2,033	2,182
Annualization Factor ⁽⁶⁾		0.08	0.08	0.08	0.08
Average Annual Concentration at Receptor Height ($\mu\text{g}/\text{m}^3$) ⁽⁷⁾		165	165	163	175
Distance To Max Concentration (m) ⁽⁸⁾		8	8	8	8

See notes on last page.

Appendix D-1. Annual Summary of SCREEN3 Model Input and Outputs, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Notes:

- (1) The stack air flow rate (in scfm) and temperature were measured using inline instrumentation. Values were measured at the blower effluent location.
- (2) The stack air flow rate at the stack temperature (in acfm) was calculated by dividing the stack air flow rate in scfm by the ratio of the standard temperature to the actual stack gas exit temperature in degrees Rankine.
- (3) The ambient temperature was recorded from the weather.newsday.com and/or weather underground (www.wunderground.com) websites for Islip, New York. The mean actual temperature from the website(s) was used in model calculation.
- (4) The receptor height corresponds to the average inhalation level.
- (5) SCREEN3 calculated constituent concentration at listed conditions at the specified inhalation level.
- (6) A USEPA time averaging conversion factor of 1/0.08 was used to convert the 1-hour maximum concentration output to an annual average.
- (7) Average annual constituent concentration at the receptor height was calculated by multiplying the one hour maximum concentration by the annualization factor.
- (8) SCREEN3 calculated distance to the 1-hour maximum concentration.
- (9) Beginning with the January 2013 site visit, the air flow rate in scfm is obtained from SCADA HMI.
- (10) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.
- (11) The September 2014 quarterly sample from VSP-5 was collected on October 1, 2014 due to system maintenance activities throughout September.

Acronyms\Key:

$\mu\text{g}/\text{m}^3$	Micrograms per cubic meter.
acfm	Actual cubic feet per minute.
ft	Feet.
g/s	Grams per second.
K	Kelvin.
m	Meters.
scfm	Standard cubic feet per minute.
USEPA	United States Environmental Protection Agency.

Appendix D-2. Annual Summary of Maximum Allowable Stack Concentration Calculations, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	Actual Effluent Concentrations ⁽¹⁾ (µg/m ³)			
	11/14/13	3/10/2014 ⁽⁵⁾	05/05/14	10/1/14 ⁽⁶⁾
1,1,1 - Trichloroethane	0	0	0	0
1,1 - Dichloroethane	1.4	5.7	4.3	5.7
1,2 - Dichloroethane	0	0	0	0
1,1 - Dichloroethene	0	0.77	0	0
Acetone	15	32	18	0
Carbon Disulfide	8.9	0	0	0
Chloroform	2.9	18	16	20
Ethylbenzene	0	0.94	0	0.99
Xylene - o	0	0.83	0	0
Xylenes - m,p	0	1.7	0	0
Methylene Chloride	0	0	0	2.2
Tetrachloroethene	0	0	0	0
Trichloroethene	0	0	1.1	2.3
Vinyl Chloride	2.6	14	4.7	55
cis 1,2-Dichloroethene	4.6	58	17	140
trans 1,2 Dichloroethene	0	0	0	0
Benzene	0.91	0	0	0
Toluene	19	33	17	20
Trichlorofluoromethane (Freon 11)	1.8	1.5	1.2	1.8
Dichlorodifluoromethane (Freon 12)	2.5	2.8	2.4	2.3
Chlorodifluoromethane (Freon 22)	400	110	93	29

See notes on last page.

Appendix D-2. Annual Summary of Maximum Allowable Stack Concentration Calculations, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	AGC ⁽²⁾ (µg/m ³)	MASC ⁽³⁾ (µg/m ³)			
		11/14/13	3/10/2014 ⁽⁵⁾	05/05/14	10/1/14 ⁽⁶⁾
1,1,1 - Trichloroethane	5,000	3.25E+07	3.24E+07	3.27E+07	3.24E+07
1,1 - Dichloroethane	0.63	4.10E+03	4.09E+03	4.12E+03	4.09E+03
1,2 - Dichloroethane	0.038	2.47E+02	2.47E+02	2.48E+02	2.47E+02
1,1 - Dichloroethene	200	1.30E+06	1.30E+06	1.31E+06	1.30E+06
Acetone	30,000	1.95E+08	1.95E+08	1.96E+08	1.95E+08
Carbon Disulfide	700	4.55E+06	4.54E+06	4.57E+06	4.54E+06
Chloroform	14.7	9.56E+04	9.54E+04	9.60E+04	9.54E+04
Ethylbenzene	1,000	6.51E+06	6.49E+06	6.53E+06	6.49E+06
Xylene - o	100	6.51E+05	6.49E+05	6.53E+05	6.49E+05
Xylenes - m,p	100	6.51E+05	6.49E+05	6.53E+05	6.49E+05
Methylene Chloride	60	3.90E+05	3.89E+05	3.92E+05	3.89E+05
Tetrachloroethene	4	2.60E+04	2.59E+04	2.61E+04	2.60E+04
Trichloroethene	0.2	1.30E+03	1.30E+03	1.31E+03	1.30E+03
Vinyl Chloride	0.068	4.42E+02	4.41E+02	4.44E+02	4.41E+02
cis 1,2 Dichloroethene	63	4.10E+05	4.09E+05	4.12E+05	4.09E+05
trans 1,2 Dichloroethene	63	4.10E+05	4.09E+05	4.12E+05	4.09E+05
Benzene	0.13	8.46E+02	8.43E+02	8.49E+02	8.44E+02
Toluene	5,000	3.25E+07	3.24E+07	3.27E+07	3.24E+07
Trichlorofluoromethane (Freon 11)	5,000	3.25E+07	3.24E+07	3.27E+07	3.24E+07
Dichlorodifluoromethane (Freon 12)	12,000	7.81E+07	7.78E+07	7.84E+07	7.79E+07
Chlorodifluoromethane (Freon 22)	50,000	3.25E+08	3.24E+08	3.27E+08	3.24E+08

See notes on last page.

Appendix D-2. Annual Summary of Maximum Allowable Stack Concentration Calculations, Bethpage Park Groundwater Containment System, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Compound	Percent of MASC ⁽⁴⁾			
	11/14/13	3/10/2014 ⁽⁵⁾	05/05/14	10/1/14 ⁽⁶⁾
1,1,1 - Trichloroethane	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethane	0.03%	0.14%	0.10%	0.14%
1,2 - Dichloroethane	0.00%	0.00%	0.00%	0.00%
1,1 - Dichloroethene	0.00%	0.00%	0.00%	0.00%
Acetone	0.00%	0.00%	0.00%	0.00%
Carbon Disulfide	0.00%	0.00%	0.00%	0.00%
Chloroform	0.00%	0.02%	0.02%	0.02%
Ethylbenzene	0.00%	0.00%	0.00%	0.00%
Xylene - o	0.00%	0.00%	0.00%	0.00%
Xylenes - m,p	0.00%	0.00%	0.00%	0.00%
Methylene Chloride	0.00%	0.00%	0.00%	0.00%
Tetrachloroethene	0.00%	0.00%	0.00%	0.00%
Trichloroethene	0.00%	0.00%	0.08%	0.18%
Vinyl Chloride	0.59%	3.17%	1.06%	12.46%
cis 1,2 Dichloroethene	0.00%	0.01%	0.00%	0.03%
trans 1,2 Dichloroethene	0.00%	0.00%	0.00%	0.00%
Benzene	0.11%	0.00%	0.00%	0.00%
Toluene	0.00%	0.00%	0.00%	0.00%
Trichlorofluoromethane (Freon 11)	0.00%	0.00%	0.00%	0.00%
Dichlorodifluoromethane (Freon 12)	0.00%	0.00%	0.00%	0.00%
Chlorodifluoromethane (Freon 22)	0.00%	0.00%	0.00%	0.00%

Notes/Acronyms:

- (1) Actual effluent concentrations are analytical results from air samples collected on the dates shown.
- (2) Compound-specific AGC values per the NYSDEC DAR-1 AGC/SGC tables, revised February 28, 2014.
- (3) Maximum allowable stack concentrations were calculated by dividing the product of the annual guideline concentration of a compound and the ratio of the SCREEN3 gas emission rate and the SCREEN3 average concentration at receptor height by the air flow rate at the stack temperature and multiplying by the appropriate conversion factors.
- (4) Percent of MASC was calculated by dividing the actual effluent concentration by the MASC for a given monitoring event.
- (5) Sample VSP-5 was retaken on March 10, 2014 due to operator error on February 18, 2014.
- (6) The September 2014 quarterly sample from VSP-5 was collected on October 1, 2014 due to system maintenance activities throughout September.

µg/m³ Micrograms per cubic meter
 AGC Annual guideline concentration
 MASC Maximum allowable stack concentration